Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

In this issue—

- Marine Bacteria — P. 1
- Deep-Living Tuna — P. 3
- Freezing Fish at Sea — P. 5
- New Metal Crab Float — P. 13
- Brining of Fillets — P. 15

— and 35 others

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JOHN L. FARLEY, Director

Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

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Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0	General and theoretical	5	Vitamins
1	Fish by species	6	Fishery byproducts
2	Fresh fish	7	Analytical Methods
3	Preserved fish	8	Composition
4	Oils	9	Miscellaneous

0.33 STUDIES OF THE MECHANISM OF VITAMIN E ACTION. III. IN VITRO COPOLYMERIZATION OF OXIDIZED FATS WITH PROTEIN

Tappel, A. L. (Department of Food Technology, University of California, Davis)
Archives of Biochemistry & Biophysics 54, No. 2, 266 (February 1955)

Acid-fast yellow-brown pigments that show a yellow-green fluorescence have been characteristically associated with the pathological in vivo oxidation of unsaturated fats. These pigments are deposited in the adipose tissue of vitamin E-deficient rats, mink, and pigs fed a diet high in unsaturated fats. The yellow-brown pigment, ceroid, which is associated with an insufficiency of dietary choline, also appears to be formed by oxidation of unsaturated fats and is probably of the same nature as the pigments of vitamin E deficiency. Similar yellow-brown pigments together with lipide peroxides have been found in human atheromatous lesions. The general relationship of yellow-brown pigment formation to unsaturated fat oxidation is further shown in the "yellowing" of bacon and the "rusting" of fish, both of which are deteriorative reactions in foods caused by oxidation of unsaturated fats.

The fact that hemoglobin and erythrocytes are excellent catalysts for the formation of these pigments further indicates that the hematin compounds of the body may be the catalysts for the in vivo unsaturated fat oxidation and related pigment formation which are associated with vitamin E deficiency.

It is the purpose of this research to determine quantitatively the effects of catalysts and inhibitors on the formation of the yellow-brown pigment and to define more precisely the interaction of oxidized unsaturated fats and proteins.

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 Reprinted in part

0.32 SPIRALING OF PROTEIN MOLECULES, COUNTERCURRENT DISTRIBUTION, AND PEPTIDE SYNTHESIS

Anonymous
Chemical and Engineering News 33, No. 6, 500 (February 7, 1955)

Spiraling of protein molecules. -- It is suggested that there are 2 types of protein-molecule configurations. These are both α-helices with either right- or left-handed threads.

The current theory is that angling occurs only at prolein molecules.

The possibility of 2 α-helices running alongside each other throughout their length is slight. Pauling suggests a structure in which the helices are tilted against each other rather than being contiguous.

Low demonstrated protein molecular structure with a model of an insulin molecule containing a left-handed helix. Iodination on the phenyl residues of the insulin side chains provided heavy atoms for scattering centers in parts of the molecule that are difficult to characterize structurally.

Countercurrent distribution. -- Countercurrent distribution has become valuable in (1) purifying materials, (2) establishing homogeneity, (3) determining molecular weights, and (4) analyzing breakdown products of hormones and antibiotics after hydrolysis. The distribution is effective with single amino acids having molecular weights of 150 as well as with protein-like substances having molecular weights of 6,000 or more.

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 ABSTRACTER: F. Bruce Sanford

0.5 MARINE BACTERIA IN RELATION TO ECONOMIC PROCESSES

Wood, E. J. Ferguson (Fisheries Division, C.S.I.R.O., Cronulla, N.S.W.)
Australian Journal of Science 16, No. 3, 87-91 (December 1953)

Far less attention has been paid to the economics of marine microorganisms than to the economics of terrestrial microorganisms. A study indicates, however, that investigations into marine microbiology are likely to yield profitable dividends, especially since improvements in land utilization are becoming increasingly difficult to make.

Marine bacteria have the following outstanding characteristics:

1. They are extremely versatile and adapt themselves readily to considerable changes in environment.
2. They act mainly, if not entirely, when adsorbed on surfaces.
3. There is evidence that at least some of their reactions are due to a symbiosis or metabiosis in which 2 or more organisms are involved.

It is difficult to evaluate the economic effects of marine bacteria because most of the marine microbiological studies have been made on those effects that are adverse to human interests. These adverse effects include:

1. spoilage of fish,
2. rotting of fishing nets and gear,
3. fouling of ships,
4. pollution of waters and beaches, and
5. corrosion of metals.

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 ABSTRACTER: Kathryn L. Osterhaug

0.36 MUSCLE PHYSIOLOGY AND BIOCHEMISTRY

Anonymous
Report of the Food Investigation Board (Great Britain) for the Year 1953, 24 (1954)

The behavior of lean meat when frozen and thawed, cured, or heat processed depends largely on the microscopic structure of the muscular tissue. This structure in turn depends upon the anatomy, physiology, and biochemistry of the muscle. The changes that take place in the complex microstructure of muscular tissue are biochemical in nature.

Studies of these changes have established that the "Marsh-Bendall factor" is the enzyme myokinase, which was previously believed to activate only the reaction

$$2 \text{ adenosine dephosphate} \rightleftharpoons \text{adenosinetriphosphate} + \text{adenosinemonophosphate}.$$

The Marsh-Bendall factor is a protein that causes the relaxation of muscle fibers in the presence of adenosinetriphosphate and magnesium ions but not in the presence of calcium ions. These studies have also established that adenosinediphosphate can be deaminated to give inosinediphosphate and ammonia. The nature of the products of this reaction has been demonstrated by chromatographic and ionophoretic techniques.

Exploration of the molecular structure of the proteins tropomyosin, myosin, and actin (the structural proteins of the muscle fibrils) has been continued. The Edman method for determining the N-terminal ends of peptide chains has been compared with the Sanger method. Tropomyosin, myosin, and actin do not appear to possess an N-terminal amino acid. The carboxypeptidase method for determining C-terminal groups was compared with the akabori method. Myosin did not have a C-

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 ABSTRACTER: Martin Heerdt

FAT-PROTEIN COPOLYMERIZATION

MARINE BACTERIA

COUNTERCURRENT DISTRIBUTION

MUSCLE PHYSIOLOGY AND BIOCHEMISTRY

0.5

On the other hand, beneficial effects include:

1. Serving as food for mollusca and plant-feeding fish,
2. Releasing nutrients from plant and animal sources,
3. Changing hydrological conditions,
4. Fermenting marine foods to make them utilizable as food for man, and
5. Removing the iron and colloidal calcium sulphate by precipitation in the preparation of salt from the sea.

Subjects that merit greater attention are (1) the possible production of antibiotics by marine bacteria, (2) the bactericidal effect of sea water, especially in the destruction of human pathogens in sewage, and (3) the pathogenic bacteria associated with fish.

0.36

terminal amino acid, but actin and tropomyosin had phenylalanine and isoleucine, respectively, as C-terminal amino acids.

The discovery that the psoas muscle of the draught horse goes into rigor mortis more rapidly than does the longissimus dorsi muscle has now been observed in cattle. With 10 animals studied at the Meat Investigation Laboratory in Brisbane, Australia, the time required after death for the onset of the fast phase of rigor mortis when the muscles were kept in nitrogen at 37° C. (99° F.), was 143 ± 33 minutes for the psoas muscles and 248 ± 31 minutes for the longissimus dorsi muscles.

Results of studies to determine the function and the amount of myoglobin, cytochrome, succinic-oxidase, and succinic dehydrogenase in the muscular tissues of animals of different species and ages were published by R. A. Lawrie in 1953.

0.33 (Cross References: 6.52, 4.5)

Yellow-brown copolymers having properties similar to the pigments characteristic of vitamin E deficiency and in vivo unsaturated fat oxidation are readily formed by the oxidation of unsaturated fats in the presence of proteins. The rate of copolymer formation is increased by the presence of amino compounds in the order: protein>protein hydrolyzate>amino acid. The hematin compounds, hemoglobin, cytochrome c, and hemin, are catalysts for copolymer formation from cod-liver oil-caseinate mixtures and function mainly as unsaturated fat oxidation catalysts. Linoleic acid and cod-liver oil readily form copolymers in the presence of hemoglobin. Hemoglobin is probably the most important catalyst for in vivo copolymer formation. Phenolic antioxidants inhibit polymer formation by inhibition of unsaturated fat oxidation.

Large amounts of protein can be incorporated into copolymers with a subsequent loss of some of the physical and chemical properties of the protein. The copolymers also contain a relatively large amount of oxygen which was removed from the air during unsaturated fat oxidation. The amount of lipide and amino compounds in the copolymers can vary over a wide range. The mechanism of copolymer formation probably involves active aldehyde browning concurrent with unsaturated fat oxidation.

The in vivo changes in catalytic and structural proteins due to vitamin E deficiency may result directly from the reaction of unsaturated fat oxidation products with protein. The explanation that the vitamin E group functions principally as an unsaturated fat antioxidant is supported.

0.32 (Cross Reference: 4.11)

Present countercurrent distribution machines have as many as 220 tubes. These machines can make quantitative recoveries even when working with only a few milligrams of material and can carry out countercurrent distributions that would require 160 years if done with a hand separatory funnel.

A large, fully automatic machine is now being designed.

Peptide synthesis. -- It is an open question whether glutathione plays a role in peptide synthesis, either by its ability to form thioesters or by its acting as a donor of a glutamyl radical. Initiation of peptide synthesis probably occurs on the particulate matter of the cell, such as microsomes. Both γ-glutamyl radical transfer and glutathione thioester reactions have been demonstrated in soluble systems. The reactions may appear in a different light when transposed experimentally to the structural elements of the cell. However, they may play a part in intermediate stages of peptide synthesis.

1.1 LONG-LINE FISHING FOR TUNA IN THE EQUATORIAL CENTRAL PACIFIC

Iversen, Edwin S. and Murphy, Garth I. (Pacific Oceanic Fishery Investigations, U. S. Fish and Wildlife Service, Hawaii)
Pacific Fisherman 53, No. 4, 22-27 (March 1955)

During a commercial long-line fishing trial of central Pacific waters by two West Coast fishing boats (the North American, an 86-foot bait boat; the Alrita, a 70-foot combination boat), 210 tons of yellowfin tuna were taken. The fishing was done on equatorial grounds previously explored by the Pacific Oceanic Fisheries Investigations of the Fish and Wildlife Service. Two cruises were made.

First cruise. -- The vessels averaged 57 baskets (855 hooks) of long-line gear per day. The yellowfin taken were of two size groups. The smaller group averaged about 55 pounds, and were called "school fish," since their capture was accompanied by signs of yellowfin at the surface. The larger group, called "deep swimming," averaged about 135 pounds and were captured both with and without accompanying surface signs of fish.

In 30 days of fishing in the vicinity of Christmas Island, the two vessels captured 2,512 yellowfin tuna weighing 206,110 pounds (298 of the yellowfin were damaged by shark). When the catch was sold, a 15-percent deduction was assessed, since some of the tuna were too dark or too "green" for a light-meat pack.

Second cruise. -- The North American fished for 40 days in the vicinity of Christmas Island. During this time, 62 baskets (930 hooks) were set per day. The following are the number of fish caught: 1,728 yellowfin, 8 bigeye, 64 skipjack, 8 albacore, 41 black marlin, 511 sharks, and miscellaneous fish.

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 ABSTRACTER: F. Bruce Sanford

1.1 TUNA LONGLINING: RESULTS OF A CRUISE TO THE EASTERN TROPICAL PACIFIC OCEAN

Wilson, Robert C. (California Department of Fish and Game) and Shimada, Bell M. (Inter-American Tropical Tuna Commission, La Jolla, California)
California Fish and Game 41, No. 1, 91-98 (January 1955)

An exploratory fishing operation was carried out in the eastern tropical Pacific region to investigate the theory that large tunas inhabit that area at subsurface depths not available to present live-bait and purse-seine fishing methods. The presence of deep-living yellowfin tuna (Neothunnus macropterus) and bigeye tuna (Parathunnus sibi) had already been demonstrated in the western and central Pacific Ocean.

Japanese-style long lines identical with those used by the Pacific Oceanic Fishery Investigations in central Pacific exploratory studies were used by the expedition. Each basket of gear consisted of 210 fathoms of line to which six 14-fathom ganging lines with hooks were attached at 30-fathom intervals. Usually, it was possible to set about 50 baskets of gear at each of the 26 stations. Most of the hooks were baited with large sardines that had been preserved aboard the vessel in a frozen condition, but in some instances, the hooks were baited partly with sardines and partly with squid. Both kinds of bait seemed to be equally effective. Each set of gear was fished for approximately six hours.

Tuna were caught at 11 of the 26 fishing stations. Stations No. 1 to No. 9 (figure 1, omitted), however, accounted for 82 percent of all the tuna taken. This result would indicate that deep-swimming large tuna were more concentrated in outlying oceanic waters than in areas close to the American mainland. The most productive zone of tuna fishing was the region adjacent and transverse to the

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 ABSTRACTER: Roy C. Stevens

1.1 NOTES ON THE FEEDING HABITS OF SUBSURFACE YELLOWFIN AND BIGEYE TUNAS OF THE EASTERN TROPICAL PACIFIC OCEAN

Juhl, Rolf (Inter-American Tropical Tuna Commission, La Jolla, California)
California Fish and Game 41, No. 1, 99-101 (January 1955)

A long-line fishing expedition in 1953 was successful in establishing the presence of deep-living large tunas in the eastern tropical Pacific Ocean (Wilson and Shimada, 1955). Because the distribution of these tunas was thought likely to be related to the presence of a favorable food supply, a study was made of their food and feeding habits.

The stomach contents of 10 yellowfin tuna (Neothunnus macropterus) and 5 bigeye tuna (Parathunnus sibi) were analyzed. The data are presented in table 1. Examination of the stomach contents showed them to consist predominantly of fish, squid, and swimming crabs. Nine of the 15 stomachs contained fish and squid and eight contained crabs. By volume, 57.8 percent of the total contents of the entire sample was fish; 27.2 percent, squid; and 15.0 percent, crabs.

The short period over which the expedition extended precluded the possibility of determining any seasonal variation that may exist in the foods of the tunas. No difference in food preferences of the yellowfin and bigeye tunas was noted.

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 ABSTRACTER: Roy C. Stevens

1.1 THE BRETON SAILING TUNNYMEN (I)

Luard, W. B.
World Fishing 4, No. 1, 2-7 (January 1955)

The 900 sailing tunnymen, which provided occupation for 5,000 to 6,000 fishermen at sea and for nearly 10 times that many workers on shore, are all but gone. This fleet was an exceptionally large one to be built for a fishery with such a short operational season (4 months).

The only fish sought was the white tunny (Thynnus alalonga), which average about 15 pounds each and vary in length from 2 to 3 feet. The tunny were taken in the Bay of Biscay, where water temperatures at 20 fathoms are above 57° F. They were observed to move northward until September, after which they moved southward again to disappear finally into deep water, in October.

At the height of the industry in 1934, Concarneau, with 30 factories (canneries), was the main marketing center. From 1931 to 1935, 3,250 to 10,500 tons of tunny were landed each year on the Atlantic Seaboard.

Sailing tunnymen were built for a life of 20 years. Their gross tonnage was between 45 and 50. They ranged from 60 to 65 feet in over-all length, with a beam of 20 or 21 feet. The tunnymen were rigged as yawls, and the canvas and hull were brightly painted with vivid shades of blue, yellow, and green.

The fishing rods (outrigger trolling poles) extended from the main mast about 55 feet. Five main lines and 2 auxiliary lines were fished from each pole. The 5 main lines (about 11 feet apart) decreased in length from about 35 fathoms for the outboard line to about 11 fathoms for the inboard line.

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 ABSTRACTER: M. R. Greenwood

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TABLE 1

Stomach Contents of Yellowfin and Bigeye Tunas From the Eastern Tropical Pacific Ocean

Species	Total length (mm.)	Place of capture Lat.—Long.	Date 1958	Stomach contents: Depth vol. (ml.)	Kind	Remarks
Yellowfin	1,443	8° 35' N.-97° 32' W.	2-2	83	Decapods	6 *Euphausiids* digested.
Yellowfin	1,220	8° 34' N.-97° 32' W.	2-2	6	Squid	Partly digested.
				0	Decapods	*E. dorsi*.
				373	Fish	Vertebral remains.
Yellowfin	1,336	8° 01' N.-96° 39' W.	2-3	4	Squid	Partly digested.
				8	Fish	Partly digested.
				3	Decapods	*E. dorsi*.
Yellowfin	1,073	7° 02' N.-96° 39' W.	2-3	12	Squid	Partly digested.
Yellowfin	1,449	5° 12' N.-95° 56' W.	2-4	0	None	Empty.
Bigeye	1,703	5° 12' N.-95° 36' W.	2-4	15	Squid	Partly digested.
				15	Decapods	*E. dorsi*.
Bigeye	1,814	3° 06' N.-95° 00' W.	2-5	78	Squid	Remains of 3.
				18	Decapods	*E. dorsi*.
Bigeye	1,507	0° 36' S.-93° 44' W.	2-8	89	Fish, Decapods	Remains of 4.
				11	Squid	*E. dorsi*.
						1 squid pen
Yellowfin	1,372	2° 36' S.-93° 08' W.	2-9	422	Fish	1 *Auxis* and other fish remains.
Yellowfin	1,507	2° 36' S.-93° 05' W.	2-9	113	Fish	Vertebral remains.
				7	Squid	2 beaks; 2 pens
Bigeye	991	4° 28' S.-92° 16' W.	2-10	4	Fish	Vertebral remains.
Yellowfin	1,655	4° 28' S.-92° 15' W.	2-10	485	Fish	1 *Auxis*.
Yellowfin	1,710	0° 15' N.-91° 20' W.	2-13	586	Fish	2 *Auxis*, one partly digested.
Yellowfin	1,714	7° 48' N.-90° 56' W.	2-19	440	Decapods	25 *E. dorsi*.
				300	Fish	1 *Auxis*.
				11	Squid	Partly digested.
Bigeye	1,530	3° 16' S.-84° 38' W.	3-4	1095	Squid	2 *Dosidicus gigas*.
				42	Decapods	*E. dorsi*.

1.1 (Cross References: 1.0148, 2.117)

The two auxiliary lines, which were weighted with short lengths of chain, were fastened between the first and second and the third and fourth main lines. Brass wire (leader), 3 or 4 fathoms long, and fitted with swivels, ran from the ends of the line to strong double-barbed hooks that were baited with artificial horse hair. Each line was fitted with a hauling guy (inhaul line), and hauling was done by hand. Lines seldom fouled, even when all were catching.

Shareholders usually owned the ships. The net profit for each season was divided into 11 shares: 4 for the shareholders, 1 to each of 5 fishermen, 1 1/2 to the skipper, and 1/2 to the apprentice fisherman, who also served as the cook.

Fishing was done by day, as the tunny sounded at night. Until 1933, when cold chambers (cooled by air circulated over ice) were put into the main holds, the fish were merely gutted, cleaned, and hung on racks amidships. Trips ranged up to 15 days in duration, with the middle 5 days being devoted to catching the maximum of 500 tunny. At the landing port, the fish were auctioned, cut into can sizes, dried, packed in tins, covered with olive oil, sealed, and then autoclaved. This procedure was followed until 1939, when canning au naturel -- no drying or olive oil -- was started.

The sailing tunnymen have been replaced since the war by double-duty (tunny-trolling and trawling) or by triple-duty (tunny-trolling, mackerel-driving, and long-lining) power boats. These new boats are about the same size as the tunnymen, but have Norwegian sterns, less draught, and less sheer.

1.1

The Alrita fished for 20 days, set 63 baskets (945 hooks) per day, and made the following catch: 689 yellowfin, 7 bigeye, 22 skipjack, 9 albacore, 16 black marlin, 216 sharks, and miscellaneous fish.

Over-all results. -- Despite the handicap of fishing in unfamiliar waters, the 7-man crews of the 2 vessels successfully adopted techniques used before only by Japanese on vessels with 20 to 40 fishermen.

On the first cruise, each of the vessels averaged about 1.75 tons of yellowfin per day; on the second cruise, each averaged about 1.78 tons per day. The yellowfin captured on the first cruise averaged 80 pounds, whereas those captured on the second cruise averaged 110 pounds. Better fishing was found within 60 miles of Christmas Island than at greater distances. The variability of the catch from day to day, however, made it impossible to detect any clearly superior fishing grounds. No fishing time was lost because of bad weather.

From these results, the authors concluded that it is commercially practicable for American fishing boats, using reasonably small crews, to fish yellowfin tuna in the equatorial central Pacific by the long-line method.

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equatorial current system, west of the Galapagos Islands. The catch at stations between 5 degrees north latitude and 4 degrees south latitude along the offshore line averaged 4.3 tuna per each 100 hooks fished per day. The best single stations were Nos. 5 and 9, where 6.7 tuna were caught for every 100 hooks fished. No surface signs of fish were observed in areas where these tuna were found to occur.

The bigeye and yellowfin tunas taken were all uniformly large fish. Most of them were over 1,400 mm. in total length and over 200 pounds in weight.

No correlation was found between plankton abundance and success of long-line fishing.

2.114 HYDRAULIC DECK EQUIPMENT

Vestre Huse, Hans
Norwegian Fishing News 1, No. 1, 19-20 and No. 2, 14-17 (1954)

Time on the fishing grounds has been reduced gradually as winch motivation has progressed from hand-driven winches and warping outfits to the motor-, steam-, electric-, and hydraulic-driven winches that are used today.

Mechanical transmission off the main engine is undesirable for winch motivation, since the speed of the winch can be controlled only by regulating the speed of the engine and since the speed of the engine in turn affects the propeller speed. In addition, this system has no provision for absorbing sudden changes in the load on the winch, such as occur when the vessel is rolling.

Steam- and hydraulic-driven winches (and one type of electric-driven winch) have the ability to give way to sudden changes and yet remain in complete control of the load.

Hydraulically driven winches are more desirable on nonsteam vessels where boilers and special, bulky equipment would be necessary just for the winch. Other advantages of hydraulic winches are (1) more efficiency, (2) quicker acceleration, and (3) higher torque.

General description of hydraulic drive. -- A pump is connected to the main engine, and oil is pumped through pipes to the hydraulic motor attached to the winch. The amount of oil allowed into the motor determines its speed. After the oil leaves the motor, it is returned to the pump through a suction pipe.

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 ABSTRACTER: M. R. Greenwood

2.6 SHRIMP BOAT FINANCING

Kahn, Richard A. (Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Washington, D. C.)
Southern Fisherman 15, No. 2, 28-29, 54-55 (February 1955)

There are aboue 6,000 shrimp vessels operating in the Gulf of Mexico and off the South Atlantic States. About 1,500 of these vessels are modern types and are equipped with depth finders, radio telephones, and similar devices.

Approximately 12,000 persons are directly employed in fishing operations, and about 10,000 more are employed in auxiliary operations working indirectly for the shrimp industries. Another 10,000 persons work in shrimp-processing plants, comprising some 400 firms.

The ex-vessel value of the shrimp catch in 1953 was about $52,000,000; the value of imported shrimp (frozen, dried, and canned) was about $21,000,000; and the value of processed shrimp at the primary processing and distributing levels was about $90,000,000.

The shrimp industry operates on a narrow credit and finance basis. The approximately 4,500 vessels of older construction are mostly paid off. They are depreciated, however, and represent only about 15 percent of their replacement value.

Most of the approximately 1,500 modern vessels were delivered under installment contracts that required a down payment of 25 percent and monthly payments of 1/36 of the balance. These modern vessels were constructed at an average cost of $50,000 apiece. About 200 to 300 vessels now enter the fleet annually, and each requires a monthly payment of approximately $1,250.

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 ABSTRACTER: F. Bruce Sanford

2.118 FREEZING AT SEA

Anonymous
Report of the Food Investigation Board (Great Britain) for the Year 1953, 28-29 (1954)

A freezer that was designed for freezing gutted fish has been tested on shore and on board the vessel Keelby over the past 3 years. This freezer, called the Torry vertical-plate freezer, is now being adapted for commercial use.

The pilot-scale Torry vertical-plate freezer on board the Keelby was recently installed in a top-loading insulated cabinet that is convenient for use in freezing fish at sea. A similar installation is also being subjected to engineering trials on shore for use in producing frozen fish for organoleptic tests.

At present, the Torry vertical-plate freezer is designed for direct expansion of the primary refrigerant, Arcton 6. With forced flooded circulation, it is possible that higher rates of freezing could be achieved and that the piping system could be less complicated. A circuit incorporating forced flooded circulation of a single-station vertical-plate freezer is now being tested, with Arcton 4 as the refrigerant. It appears that the performance of the forced flooded system may be an improvement over the direct expansion system.

A suitable seal for the shaft of the pump circulating the low-temperature liquid refrigerant has been difficult to find. Until the present, the best mechanical seal has operated for only 170 hours of severe test, but improved types of seals are now available. The running life of this pump shaft could be increased if an electric-motor drive were hermetically sealed into the pump casing, but very few of the existing trawlers generate enough electricity for such use.

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 ABSTRACTER: Martin Heerdt

2.1123 ATOM-LINE TRAILING

Anonymous
Norwegian Fishing News 1, No. 2, 18-20 (1954)

A new method of fishing with rubber-worm baits has recently been developed for use particularly with mackerel (Scomber), pollock (Gadus pollachius), coalfish, and other school-fishes found off Norway. This method has been widely accepted and has proved effective as well as economical.

For "Atom-Line Trailing", a nylon line (diameter, 1 millimeter) of a length of at least 40 fathoms is preferred. Rubber-worm baits spaced 1 fathom apart are used. If proper bait action and ease in handling the line is to be obtained, it is imperative that snells not be used. Instead, the lure should be fastened to a short bight in the line.

A requisite is a curved tube extending partially across the deck of the vessel and down over the side. After threading the line through this tube, the fisherman should tie the ends together so that when the line is played out, it will form a large loop or circle.

As the vessel moves forward, the endless line is hauled up over the side, and the fish that have been caught are removed. The gear then continues on through the tube and back into the sea on the opposite side of the vessel. Thus, an important feature of this method is the continuous fishing of some baits at various depths.

Although Norwegian fishermen have extensively used rubber-worm baits for 50 years, it was not until this improved method of fishing was developed that these baits proved effective.

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 ABSTRACTER: Harold C. Johnson

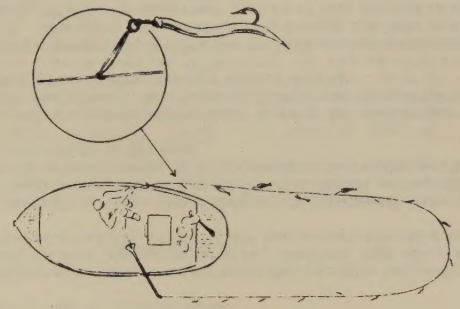
2.118 (Cross Reference: 3.231)

The Torry Research Station has recently assisted in a plan for the conversion of an existing Arctic-type trawler to enable it to freeze the first part of its catch. Various refrigeration-plant layouts have been investigated to evolve a type of installation that will occupy a minimum of fish-hold space and that will retain complete operational convenience and flexibility. Detailed records of rates of catch have been analyzed to provide an estimate of the amount of fish that could be frozen by various sizes of plant before exceeding the permissible delay between catching and freezing.

The effect of prefreezing treatment upon the quality of cod frozen at sea continues to be of interest. Fish that are to be frozen apparently require the same amount of care in gutting and icing as has been recommended for the handling of fresh fish aboard trawlers. Fish that had been iced for 3 days, frozen, and then stored for a period of time at -28.9°C. were entirely satisfactory when thawed and then smoke cured. Studies in progress will determine if fish held for more than 3 days in ice before freezing will yield a satisfactory product. The permissible delay before freezing is the main factor that influences the size of the freezer to be installed on a trawler.

2.1123

Sizes of the baits range normally from Nos. 0/1 to 0/5 for sport fishing and from 0/6 to 0/12 for commercial fishing. The colors supplied are yellow, white, black, amber, and red, with red being used more than all the other colors combined.



2.114

The pump. -- The pump is driven by a belt pulley off the flywheel on slow-running main engines. The positive-displacement vane-type pump delivers oil at a pressure of 350 to 400 p.s.i. at full load of the winch. This low-pressure system, although heavy and large, is used for economy and to reduce the amount of air that is found mixed with the oil -- a common source of trouble in high pressure systems. An additional pump, if used, is driven either directly by transmission or by belt from the auxiliary engine.

The winch. -- The hydraulic motor in the winch has rotating vanes that are movable radially. A conveniently located control lever moves a slide that regulates the quantity and direction of the oil stream going into the motor. A check valve in the slide prevents the oil flow from reversing. Thus, no brake is needed on the winch, and even the failure of the pump will not release the load. The motor is connected directly to the wire drum, warping ends, or chain messengers. This means of transmission eliminates the power losses that occur in other types of drives.

In hauling, the control on the winch motor can be set for a certain load. When this load is exceeded -- as when a trawler rises on a swell -- the winch automatically stops turning; when the strain is taken off the hauling gear, the winch starts winding again -- all without further manipulation of the control. This type of equipment, when used on vessels off Iceland and Greenland, reduced gear losses about 50 percent as compared to the losses experienced with mechanical types of winches. The hydraulic winches also permitted hauling in much rougher weather.

Hydraulic winches have been used on combined net-warping and long-lining winches, on anchor winches, on up-to-12-ton trawl winches, and on purse-seine winches that handle as much as 500 tons of fish and gear in an hour. A survey of 300 to 500 purse seiners using hydraulic winches revealed not a single mishap.

2.6 (Cross Reference: 1.85)

Vessel loans in the Gulf States are usually secured by a preferred mortgage, and the vessels must be covered by full insurance. The vessels must also be covered by protection policies and indemnity policies for the crew. These insurance expenditures are high, running up to 10 percent of the value of the vessel. Thus, part of the loan must often be used for payment of the first year's insurance.

One of the reasons why the banks do not extend longer credit is the need for certain guarantees (which are often given by the construction company that built the vessel). Through the efforts of the Fish and Wildlife Service, the Maritime Administration has now adopted, in regard to these guarantees, a new policy. The favorable effects of this policy cannot be overestimated: (1) Shrimp-vessel owners will now obtain loans, from their banks, under more favorable interest rates because these loans are guaranteed by the United States Government; (2) the vessel owners will obtain loans on terms extending over a period of 5 to 6 years (this longer period will result in a reduction of payments from about $1,250 per month to about $625 to $750 per month, which will mean, for many vessel owners, the difference between a good and a poor livelihood); and (3) shipbuilding firms will be relieved from the necessity of guaranteeing the bank loans.

3.4 SMOKE CURING

Anonymous
Report of the Food Investigation Board (Great Britain) for the Year 1953, 29-31 (1954)

About 7 percent of the annual whitefish catch and about 12 percent of the annual herring catch in Great Britain is processed into cold-smoked fish products, such as finnan haddocks and kippers. More convenient and economical commercial smoking practices are needed in Great Britain to produce cures of higher quality.

Physics of wood smoke. -- Wood smoke contains colorless gases and particles in suspension. A study is now in progress to learn about the factors that influence the deposition of smoke particles on the surface of fish. The vibrating image-field technique has been used to measure the size of the individual particles, and the shadow-casting method has been used to determine the relative number of particles of the various sizes. With the aid of a smoke meter, it has been found that the optical density of the smoke is related to its mass. Beer's law has been found to apply even at the highest densities of the smoke.

The commercial use of the Torry-controlled kiln or types similar to it for smoking fish has been encouraged. To provide a source of smoke of controlled density, a small chain-grate stoker and burner has been constructed for use in smoke-production experiments. If this stoker and burner prove successful, it may be applied to existing semi-automatic industrial kilns.

Chemistry of wood smoke. -- The major part of the bactericidal activity of wood smoke is due to three distinct groups of phenols. These phenols have been separated chromatographically by the use of a cellulose column. The one phenol group that has been identified exerts a more powerful effect

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 ABSTRACTER: Martin Heerdt

3.6 DRYING

Anonymous
Report of the Food Investigation Board (Great Britain) for the Year 1953, 31-32 (1954)

Drying in air. -- Air drying and vacuum drying have been tried as a means of drying fish muscle, under a wide range of conditions. During 1953, attention was concentrated on air drying.

The effect of relative humidities ranging from 25 percent to 90 percent, and of temperatures ranging from 20° to 60°C. on the rate of drying of raw cod fillets have been determined. The major portion of the curve that relates the loss of weight to drying time is exponential in form.

The drying weight may be characterized by the constant that appears in the exponent. This constant has the dimensions of time and has therefore been called the "drying-time constant."

The drying-time constant for a given shape of fish is unaffected by relative humidities up to 80 percent. Above this level, however, it increases significantly. A linear relationship exists between the drying-time constant and the temperature. With a fillet that has a ratio of volume to surface area of 0.5 centimeters, the drying-time constant decreases by approximately half an hour for a rise in temperature of 1°C.

Capacitance-resistance hygrometer. -- Work has continued on the development of a capacitance-resistance hygrometer. This instrument will facilitate the measurement and control of humidity in air-drying chambers, vacuum-drying chambers, and cold-storage rooms. It may also be used to measure the moisture content of solid and granular materials.

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 ABSTRACTER: Martin Heerdt

3.231 HOW TO REDUCE CORROSION IN BRINE SYSTEMS

Joselyn, H. Nye
National Provisioner 132, No. 6, 55-56, 80 (February 5, 1955)

Corrosion of metal in brine refrigeration systems can result in partially concealed high production costs, in improper cooling, and in short life of expensive equipment. Corrosion in unit coolers may clog or weaken fan blades, plug baffles, and obstruct air flow through coils. Rust on pipe coils can cut down the refrigeration capacity more than 50 percent.

Galvanizing may be accepted as only a partial solution. Zinc coating is not entirely passive to the chemical action of strong brine, and it is also subject to cracking, flaking, crushing, or other damage in handling and fitting into place. Any small imperfection in the galvanizing allows brine to creep under the coating and cause serious deterioration.

Control of corrosion caused by brine used in refrigeration is accomplished by neutralizing the solution, to prevent electrolytic action, and by providing a protective film on the surface of the metal. The pH should be adjusted to a range of 7.5 to 8.0. An accepted way to bring the brine from the acid side up to the desired range is to add sodium hydroxide to the mixing tank in small amounts at 2- to 3-hour intervals. In the reduction of the pH from the alkaline side to the desired range, small amounts of hydrochloric acid, diluted 3 to 1 with water, may be poured in the mixing tank ahead of the agitator. Brine mixture should be tested at regular intervals to insure against changes in pH that can be brought about, slowly, by absorption of air, moisture, or fumes and, abruptly, by an ammonia leak in the cooling coils or by use of old, contaminated salt.

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 ABSTRACTER: Roy C. Stevens

3.239 EFFECT OF FREEZING ON THE FINE STRUCTURE OF FISH MUSCLE

Anonymous
Report of the Food Investigation Board (Great Britain) for the Year 1953, 27-28 (1954)

Damage to the muscle cells of cod as the result of freezing was investigated by an analysis of the press fluid after thawing of the muscle. The fluid component most indicative of cell damage was deoxypentose nucleic acid (DNA). This substance occurs only in the nucleus of the undamaged cell. Its appearance in the intercellular fluid and in the expressible fluid indicates that the cells have been ruptured.

The concentration of DNA in the expressible fluid increased slowly in fillets frozen with increasing rapidity. After a time, the concentration of DNA rose to a sharp maximum and then dropped to a low level as the rate of freezing was further increased. Histological examination of the frozen tissue indicates that this maximum occurred when ice crystals entered the muscle cells.

When the muscle tissue of fillets from medium-sized cod was frozen slowly in still air at -10°C., large masses of ice formed between fibers of the muscle. If the rate of freezing was increased sufficiently, ice began to form within the fibers. During slow freezing, the crystals were large enough to burst the sarcolemmas, but as the freezing rate increased, the crystals became progressively smaller and caused less damage.

There was a further increase in the amount of DNA in the expressible fluid of fillets frozen from both sides, with extreme rapidity, in liquid air. This increase is believed to result from rupture caused by the pressure that occurred when the tissue in the middle began to freeze and expansion was resisted by the surrounding hard shell of already-frozen tissue.

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 ABSTRACTER: Martin Heerdt

3.231 (Cross References: 2.114, 2.118)

The presence of chromate in the brine gives maximum protection against corrosion by building up a shielding film on the metal surfaces. Either crystalline sodium dichromate or chromic acid may be used. Chromate, because of its acid reaction, should be added to the brine before adjusting the pH. The standard initial treatment is 200 pounds of sodium dichromate to 1,000 cubic feet of sodium-chloride brine, or 6 pounds of the acid to 1,000 cubic feet of the brine. Chromate-treated brine does not need to be renewed, except that new or make-up brine should be equally treated to maintain 10 to 20 p.p.m.

Sodium silicate is sometimes used as an alternate to the chromate treatment. It is mixed 50 to 100 pounds of silicate to 1,000 cubic feet of brine. One gallon of the silicate is diluted with 9 gallons of water and after being heated to about 200° F., is poured slowly into the brine ahead of the agitator. After about 2 weeks, the sodium silicate settles out, leaving a thin, protective coating on the exposed metal of the system.

Tests for pH, ammonia, and adequacy of film treatment are described.

3.239

Also being studied for its influence on DNA concentration are the effects of mincing the fish flesh, of spoilage during storage in ice, and of the area of cut fillet surface.

3.4 (Cross Reference: 1.2)

than does either of the other two. This group consists of 1-3-dimethylpyrogallol and its 5-methyl, ethyl, and propyl derivatives.

Relative humidity, temperature, and related physical conditions are being studied for their effects on the rate of deposition of smoke constituents. The rate of deposition of smoke phenols was found to be directly proportional to the optical density of the smoke for all stages of the smoking process except possibly the last one.

The estimation of the groups of phenols found in smoked fish is being continued.

Kippering: Process and quality control. -- It is believed that a grade of kippers produced under carefully standardized conditions can be used as a practical yardstick for measuring the numerical quality of commercial kippers. An attempt will be made to relate the objective chemical and physical indices of kippers to their appearance and eating quality.

The cold storage of kippers. -- Surplus quantities of good-quality summer and autumn herring are frozen and stored at low temperatures, either unprocessed or as kippers for sale when herring are less plentiful. The oil of fresh frozen herring does not become rancid as rapidly as does the oil of kippered frozen herring. Differences in the initial smoke-curing process and in the method of packing the kippers for freezing also affect the quality of the kippers.

Experiments are in progress with dried split herring and dried split smoked herring or kippers. These experiments indicate that the drier fish have a greater tendency to become rancid during cold storage. This effect is only slight and is normally obscured by the antioxidant effect of wood smoke so that the more heavily smoked and dried products usually have the better keeping quality.

3.6

Recent experiments have shown that this instrument is capable of operating under the following conditions: (1) from below -20° to above 400° C., (2) from 0 percent to 90 percent relative humidity, and (3) from 0 atmospheres to several atmospheres air pressure. Hysteresis is not apparent, provided that the relative humidity does not exceed 90 percent. At ambient atmospheric temperatures, the temperature coefficient is small. After preliminary aging, the element characteristics remain stable over long periods of time.

The new hygrometer has been patented and may be developed commercially. It is believed that a study of the principles involved in its operation will lead to a better understanding of its performance. Work of this nature is therefore being carried out at the University of London.

Dielectric properties of fish muscle. -- The dielectric properties of fish muscle are being studied to obtain data for use in experiments on the accelerated drying of fish by dielectric of eddy-current heating. Preliminary measurements of fresh and partly dried cod muscle in the frequency range 50 kc/s to 50 mc/s have shown that the specific resistance alone can be measured conveniently. Near-dry samples will be measured next.

4.11 APPLICATION OF ULTRAVIOLET SPECTROPHOTOMETRY TO THE ANALYSIS OF FATS AND DERIVATIVES

Herb, S. F. (Eastern Regional Research Laboratory, Philadelphia)
Journal of the American Oil Chemists' Society XXXII, No. 3, 153-158 (March 1955)

The unsaturated fatty acids occurring in most common fats and oils have non-conjugated double-bond systems that do not absorb in the near-ultraviolet spectral region. However, if the unsaturated fatty acids or the oils containing them are heated with alkali, conjugated isomers are formed. These conjugated isomers absorb strongly and exhibit well-definied maxima in the near-ultraviolet region. As a result, methods based on ultraviolet spectrophotometric measurements of alkali-isomerized fats and oils are widely used in analysis. Important factors in the isomerization procedure are (1) the strength of alkali, (2) solvent for alkali, (3) temperature, (4) time of heating, and (5) size of sample. The most widely used method -- that proposed as the American Oil Chemists' Society Tentative Method CD 7-48 -- employs 6.5 percent potassium hydroxide in glycol as the isomerization agent. This method has been improved by the use of absorptivity constants based on pure polyunsaturated fatty acids, isolated by physical means.

Other methods using 11 percent potassium hydroxide in glycerol or in glycol and 21 percent potassium hydroxide in glycol for isomerization have also been developed. Adaptations of the methods for semimicroanalyses and microanalyses have been used, particularly in biological and medical research.

It is important when choosing a method to choose one that provides absorptivity constants for all of the polyunsaturated acids that will be present in the sample.

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 ABSTRACTER: W. N. Sumerwell

4.11 UREA AND THIOUREA COMPLEXES IN SEPARATING ORGANIC COMPOUNDS

Swern, Daniel (Eastern Regional Research Laboratory, Philadelphia)
Industrial and Engineering Chemistry 47, No. 2, 216-221 (February 1955)

A new separation technique that has already become a powerful tool is the formation of crystalline inclusion complexes (adducts) of urea or thiourea with organic compounds. These complexes have the unique characteristic of permitting the isolation of gases, liquids, and solids in a solid form. Since the substance being separated is included in the crystalline framework of urea or thiourea, the weight and volume increase simplifies the handling of small quantities of the desired substance.

The complexes that are now most widely used are those of urea. One of the reasons for the emphasis on urea complexes is that some potentially important industrial applications have been discovered for them. Furthermore, urea is plentiful and cheap, and its complexes are easy to make.

All urea complexes apparently have the same melting point as that of urea (133° C.). None of the complexes studied have been stable above this temperature.

In general, ease of formation and stability of urea complexes increases with increasing chain length of the substance being complexed. If the length is 7 or fewer carbon atoms, the complex will not be stable. The stability appears to vary in some inverse way with the vapor pressure of the included compound. Vapor pressure however, is not the sole criterion for complex stability.

Contrary to early belief, certain branched-chain compounds or even those containing cyclic structures will form urea complexes, provided that there is a sufficiently long straight chain in the

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 ABSTRACTER: F. Bruce Sanford

4.90 FISH OIL IN POULTRY RATIONS

Driggers, J. Clyde (University of Florida)
Flour and Feed 56, No. 3, 9 (March 1955)

Two experiments were conducted to see whether fish body oil could be used for a limited time and in limited quantities in a broiler ration without imparting the fishy odor and flavor to the meat.

The first of these experiments was initiated using three lots of two pens each with each pen containing 25 broiler-strain New Hampshire chicks. Lot 1 was the control and received no added fat to the University of Florida broiler formula. Lot 2 received the same feed but with two percent of fish body oil replacing yellow corn meal, while lot 3 received four percent of fish body oil replacing yellow corn meal.

At eight weeks of age, the pens in lots 2 and 3 were divided equally and one-half were continued on the same feeding program while the other half received the lot 1 feed. The experiment was terminated at 10 weeks at which time representative samples from each lot were taken for cooking and taste tests.

Those birds in lot 3 receiving the four percent of fish body oil to term had a strong fishy flavor and would not be acceptable on most markets. The birds receiving the two percent of oil to term and those receiving the four percent to eight weeks followed by the control feed for two weeks had a positive fishy flavor and would probably not be acceptable as a market broiler.

The lot 2 birds from which the oil was removed at eight weeks had a very mild fish flavor and would possibly be suited for some less-discriminating markets.

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4.19 FATTY ACID CONSTITUENTS OF SQUID OIL

Yamada, Minoru (Faculty of Fisheries, Hokkaido University)
Bulletin of the Faculty of Fisheries, Hokkaido University 5, No. 1, 86-93 (May 1954)

This paper is concerned with the fatty acid structure of the oil obtained from squid (Ommastrephes sloani pacificus Steenstrup).

The physical properties of the original squid oil, the squid-oil mixed fatty acids, and the squid-oil solid and liquid acids are shown, respectively, in tables 1, 2, and 3.

The lead-salt alcohol method was used to determine the solid- and liquid-acid content of the squid-oil mixed fatty acids. Fractionation by the lithium-salt acetone method showed that 38.4 percent of the mixed fatty acids was highly unsaturated. These highly unsaturated acids had a neutralization value of 168.5, an iodine value of 338.2, and a refractive index of n_D^{20} 1.4966. The mixed methyl esters contained 24.5 to 26.0 percent methyl esters of saturated fatty acids.

The author estimates that the mixed fatty acids contained roughly 25 percent saturated acids, contained less than 24 percent acids of the oleic acid series, and contained more than 51 percent acids of higher unsaturation than those of the oleic acid series. Among the saturated acids, palmitic acid was present in the largest quantity; stearic acid and myristic acid were present each in lesser quantitites; and arachidic acid and vehenic acid were present only in small quantitites. In the oleic acid series, C_{16}, C_{18}, C_{20}, C_{22}, and C_{24} acids were present. Among the acids of higher unsaturation than those of the oleic series $C_{18}H_{28}O_2$, $C_{18}H_{30}O_2$, and $C_{22}H_{34}O_2$ acids were present. The author deduced that $C_{20}H_{32}O_2$, $C_{22}H_{36}O_2$, and $C_{22}H_{38}O_2$ acids were present among the mixed fatty acids.

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 ABSTRACTER: Martin Heerdt

4.90

The second experiment was conducted in a similar manner as the first except White Plymouth Rocks were used and one-half and one percent of fish body oil was added to lots 2 and 3, respectively. These birds were continued on this experiment to 10 weeks without change and then sampled for cooking and taste tests.

Birds receiving the one percent of fish body oil had a very mild fishy flavor and would possibly be suited for some less-discriminating markets. In some instances there was a trace of fishy odor and flavor in those birds receiving the one-half percent of fish body oil continuously. These birds, however, would probably be acceptable on most markets.

In each case where the fish body oil was used, the physical appearance and palatability of the feed were excellent. The feed efficiency and body weights were improved somewhat when the oil was used but not significantly. Mortality was very low in each experiment.

4.19 (Cross Reference: 1.89)

Table 1. Properties of squid oil

Color	Reddish orange
Ref. index n_D^{30}	1.4820
Specific gravity d_4^{30}	0.9267
Acid value	16.8
Sapon. value	184.9
Iodine value	196.9
Unsap. matter (%)	4.28

Table 2. Properties of mixed fatty acids

Color	Yellow inclining slightly to orange
Melting point	27–31° C
Neut. value	188.8
Iodine value	153.3
Ether-insol. brominated fatty acids (%)	77.81

Table 3. Properties of solid and liquid acids

	Solid acids	Liquid acids
Yield (%)	23.5 (diff.)	76.5
Neut. value	203.6	185.5
Iodine value	18.2	241.7
Ref. index n_D^{30}	—	1.4815
Melt. point	53–55° C	—

4.11

No spectrophotometric method of analysis has yet been developed that is applicable to marine oils, because of the lack of absorptivity constants for all the acids present and also because of the unusual isomers and homologs found in these oils. However, several observations that have been made concerning unsaturated marine-oil fatty acids indicate that a satisfactory spectrophotometric method for marine oils may be developed in the future. Fish oils are reported to have a number of unsaturated acids that have 1,5-diene systems (double bonds separated by two methylene groups) as opposed to the usual 1,4-diene systems (double bonds separated by one methylene group) present in most land animals and plants. For example, 6,10,14-hexadecatrienoic acid has been isolated from sardine oil, whereas 7,10,13-hexadecatrienoic acid has been isolated from rape-leaf oil.

It has been shown that 1,5-diene systems react very slowly under the conditions of alkali isomerization used for linoleic and linolenic acids. However, the products obtained by alkali isomerization of 1,5-diene systems have quite similar absorption curves to those of the corresponding compounds with 1,4-diene systems. These facts may serve as the basis for a spectrophotometric method for marine oils when sufficient additional data become available.

Spectrophotometric methods for studying conjugated acids in such oils as tung oil and dehydrated castor oil are also widely used. The conjugated acids can be estimated by simply diluting the sample in a suitable solvent and measuring the absorption in the analytical regions. These methods will become more accurate as better absorptivity constants become available.

4.11

molecule and that the branch or cycle is not too large. Thus although benzene does not form urea complexes, 1-phenyloctadecane, in which the ring is at the end of a long chain, does. Phenyl hexanoate does not form a urea complex because the straight-chain part of the molecule is too short, whereas phenyl dodecanoate does form a complex.

Preparation. --- Urea complexes can be prepared in various ways. The preparative technique selected depends largely on the solubility and vapor pressure of the compound being studied, whether a high yield or high purity of complex is desired, and, if mixtures are being studied, what degree of separation is wanted. The author discusses seven of the more important techniques.

Analysis. -- The composition of urea and thiourea complexes can be determined by a variety of chemical and physical methods.

Determination of acid or saponification number permits calculation of the composition of acid or ester. (Urea has a small saponification number for which a correction must be made.) Complexes of unsaturated compounds can be analyzed directly by halogen-absorption methods. Analyses for carbon, hydrogen, nitrogen, sulfur, and halogen are made when functional-group methods are inapplicable. The complex can be decomposed by addition of hot water, to dissolve the urea, or by addition of a hot organic solvent in which urea is insoluble, to dissolve the included compound.

Of the physical methods, the simplest is to note the weight decrease when the complex is exposed to a high vacuum. Refractometric and colorimetric methods are also used.

Other topics. -- Other topics discussed by the author are (1) applications in fat field, (2) separation of optical isomers, and (3) thiourea complexes. He lists 87 references.

6.190 A FACTOR IN OIL MEALS AFFECTING ANIMAL FAT COMPOSITION

Anonymous
Nutrition Reviews 13, No. 3, 94 (March 1955)

The fatty acid composition of carcass fats in animals is affected primarily by the unsaturated fatty-acid composition of the dietary fats. Animals that are fed vegetable oils or vegetable-oil meals high in 2-double bond (diethenoic) or 3-double bond (triethenoic) unsaturated fatty acids build carcass fats that contain large amounts of these unsaturated fatty acids. The carcass fats then become soft in texture because of the low melting point of the fat.

Not all fats behave in this manner. When the cottonseed oil contained in cottonseed meal is fed in small amounts to swine, a carcass fat is produced that is firmer than is the fat obtained on controlled rations. However, if the cottonseed meal is increased to more than 15 percent of the ration, a distinct softening effect is produced in the carcass fat. These observations prompted Hostetler, Halverson, and Sherwood to investigate the influence of dietary protein on the unsaturated fatty-acid content of the carcass fat in rats.

Weanling rats were fed, for 6 to 7 weeks, purified diets that contained 5 percent cottonseed oil and 23 percent protein, after which the rats were analyzed for unsaturated fatty acids. Dietary protein that consisted of ether-extracted soybean meal or cottonseed meal produced carcass fats that contained 23 to 24 percent monoethenoic acids, 28 percent diethenoic acids, 0.4 to 0.5 percent triethenoic acids, and 2.5 to 2.8 percent tetraethenoic acids. When the meal proteins were replaced with egg albumin, casein, fibrin, or soybean α-protein plus methionine, the diethenoic acids decreased to 20 to 22 percent of the total fatty acids, and the monoethenoic acids increased to 28 to 30 percent of the total fatty acids. The amounts of triethenoic and tetraethenoic acids also decreased.

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 ABSTRACTER: Martin Heerdt

6.193 THE USE OF DEPLETED RATS FOR INVESTIGATIONS OF VITAMIN B_{12} AND UNIDENTIFIED FACTORS

Sherman, W. C.; Schilt, H. L.; and Schaefer, H. C. (Ralston Purina Company, St. Louis, Missouri)
Journal of Nutrition 55, No. 2, 255-263 (February 1955)

The authors point out that before the isolation of vitamin B_{12}, several workers obtained inferior reproduction in rats or abnormal growth of weanling rats when the breeding females were fed all-vegetable rations or purified rations. Results were improved, however, by the inclusion in the diet of such materials as liver powder, fish meal, meat, crude casein, milk products, egg yolk, and alfalfa and other leafy materials.

Following the isolation of vitamin B_{12}, the responses of depleted rats to this vitamin made it appear possible that vitamin B_{12} was the source of the main, if not entire, activity of the "animal protein factor," "zoopherin," or "factor X."

The ability of vitamin B_{12} to counteract thyrotoxicity in rats fed iodinated casein has been used as a basis for vitamin B_{12} assays. However, the extent to which unidentified factors may affect the response of hyperthyroid rats to vitamin B_{12} has apparently not been investigated.

The purpose of the present paper was to report the results of experiments conducted in conjunction with assays of various sources of unidentified factors and of vitamin B_{12}, using weanling rats that were depleted in these factors.

The authors found that the weanling rats responded to vitamin B_{12a} and to graded levels of vitamin B_{12} but not to pseudovitamin B_{12}. The addition of unidentified factors produced more than

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 ABSTRACTER: F. Bruce Sanford

6.3 ION-EXCHANGE PROPERTIES OF AGAR

Currie, T. (British Dyewood Co. Ltd., Glasgow)
Chemistry and Industry, No. 5, 116 (January 29, 1955)

The known properties of agar suggest that it might be a naturally occurring ion-exchange material. This suggestion was examined by a series of experiments using agar from different geographical sources, immersing in the cationic chloride solution, washing free from adherent ions, drying and estimating the relevant cation present. The results are shown in Table 1.

An experiment using washed commercial South African seaweed was similarly carried out (Table II).

The results show that agar whether isolated or remaining in the weed is an ion-exchange material, the capacity varying directly with the sulphur content.

Attempts to produce the hydrogen cycle proved abortive even with the use of 0.01N-hydrochloric acid. However, it was noticed that whereas all the sulphate groups were hydrolyzed from Japanese agar only about 35% were removed from Danish agar using even 2N-hydrochloric acid. This suggests possible cross-linking in the latter. The former was incapable of uptake of cations although the product formed a gel in the usual way. Further work will be reported elsewhere.

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6.190 THE EFFECT OF ADDED METHIONINE IN BROILER DIETS CONTAINING HIGH LEVELS OF FISH MEAL

Rosenberg, Hans R.; Waddell, J.; and Baldini, James T. (E. I. du Pont de Nemours and Co., Inc., Newark, Delaware)
Poultry Science 34, No. 1, 114-121 (January 1955)

Recent reports have shown supplemental synthetic DL-methionine to be of value in practical broiler rations. The basal diets used, however, appeared to be borderline in methionine and cystine, according to either the National Research Council allowances or to the more recent data of Almquist.

It has always been assumed that methionine will be beneficial only when added to a diet deficient in sulfur-bearing amino acids. Consequently, it was of interest to test the effect of supplemental DL-methionine in diets containing adequate amounts of methionine in the natural, bound form, especially since previous observations in the authors' laboratory indicated that free DL-methionine in broiler diets might have some unique, beneficial results.

Thus, the present paper reports experimental work in which the effect of DL-methionine was tested as a supplement to basal diets containing varying amounts of natural, bound methionine.

Diets. -- Three diets were used: Diet A was a simplified corn-soybean oil meal diet. Diet B was similar to Diet A but contained 5 percent added fish meal. Diet C was also similar to Diet A but contained 15 percent added fish meal.

All 3 diets were adjusted for protein (21.5 percent) and mineral content, and corn oil was used in the adjustment of energy values. A vitamin and antibiotic supplement containing penicillin was added, and choline was also added.

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 ABSTRACTER: F. Bruce Sanford

FAT-DEPOSITION FACTOR

ION-EXCHANGE PROPERTIES OF AGAR

UNIDENTIFIED FACTORS IN FISH MEAL

METHIONINE ADDED TO FISH-MEAL RATIONS

6.3

Table I

Source	Cycle	On dry wt. basis. Ash, %	Sulphur, %	Ca^{++}, %	NH_3, %	K^+, %
Japan	Commercial	2 62	0 7408	0 3933		
	Ca^{++}	2·828	0 6863	0 9788		
	NH_4^+	0 412	0·6010	0 0786	0 425	
	K^+	2 002	0·6807	Nil		1 67
South Africa	Commercial	4 70	1 026	Nil		
	Ca^{++}	2 29	0 897	0·852		
	NH_4^+	1 12	0·849	Nil	0·4898	
New Zealand	Commercial	1·78	0·5526	0 3582		
	Ca^{++}	1·67	0 5153	0 3788		
	NH_4^+	0·22	0 5614	Nil	0·2357	
	K^+	1·87	0 5500	Nil		0·64
Denmark	Commercial	24·75	6·136	Nil		11 95
	Washed Commercial	15 5	6 316	Nil		3 58
	Ca^{++}	12 28	6 183	2 873		1·51
	NH_4^+	3 186	6 177	Nil	1·651	
	K^+	9 417	6 021	Nil		7·25
Britain	Commercial	34·6	10 11	1 470		
	Washed Commercial	29 2	10 96	1 602		6·54
	Ca^{++}	19·0	9·262	3·496		
	NH_4^+	8·35	9 53	0 3160	2·73	
	K^+	21·90	9 31	0·3715		6·33

Table II

Cycle	On dry wt. basis Ash, %	Ca^{++}, %
Washed	8·35	1 097
Ca^{++}	6 10	1 38
NH_4^+	4·58	0·89

6.190

Diet A and Diet B contained less methionine and cystine than the recommended allowances, whereas Diet C contained methionine and cystine in amounts well over these levels. Hence Diet C was well suited to determine the action of free DL-methionine in a diet containing a level of bound methionine above the recommended level.

In the experimental work, each of the 3 diets were tried with and without 0.05 percent added methionine.

Results. -- Increasing the level of bound methionine in the diet increased the response to added DL-methionine. Fish meal did not increase growth but seemed to cause some improvement in feed efficiency. On the other hand, the addition of methionine resulted in significant improvements in growth, but feed efficiency was not appreciably improved. The interaction between fish meal and methionine was both evident and significant.

Summary. -- (1) The addition of free DL-methionine proved to be of benefit in chick starter diets containing adequate amounts of bound sulfur-bearing amino acids. (2) The benefits obtained from the addition of fish meal and methionine together were greater than would be expected if the beneficial effects were purely additive.

TABLE 2.—*Effect of free methionine in chick diets containing various amounts of protein-bound methionine (8 week data)*

Treatment	Experiment 1 Weight gain	Experiment 1 Feed gain	Experiment 2 Weight gain	Experiment 2 Feed gain
1. Diet A (3% fish meal)	1,215	2 20	1,117	2 15
2. Diet A+0.05% DL-methionine	1,203	2 20	1,310	2 11
3. Diet B (1½% fish meal)	-	-	1 298	2 11
4. Diet B+0.05% DL-methionine	—	—	1,351	2.12
5. Diet C (1½% fish meal)	1,191	2 16	1,318	2 09
6. Diet C+0.05% DL-methionine	1,270	2 09	1,346	2 07

Source	Observed F, Experiment 1	Observed F, Experiment 2
Fish meal	0 280	1 028
Methionine	5 064*	3 809*
Fish meal × methionine	12 624†	4 900*

* Significant at the 5 percent level.
† Significant at the 1 percent level.

6.190 (Cross Reference: 4.90)

Since it is possible that residual traces of unsaturated fatty acids present in ether-extracted soybean or cottonseed meal could be the cause of the difference in the behavior of these feeds, ether-extracts of acid hydrolyzates of soybean meal were fed as supplements to the egg-albumin diet. These extracts when fed to rats had no influence on the unsaturated fatty-acid content of their carcass fats.

An attempt was then made to extract the soybean-meal factor causing the higher diethenoic acid content of carcass fats. Both soybean meal extracted with 70-percent methanol and unextracted soybean meal produced the same unsaturated fatty acid composition in the carcass. The addition of the methanol extract to the egg-albumin diet, however, caused an increase in carcass diethenoic acid and a decrease in carcass monoethenoic acid comparable to that obtained with ether-extracted soybean meal.

It appears therefore that soybean and cottonseed meal, after ether-extraction, contain factors of unknown nature that favor the deposition of diethenoic acids in rat carcasses. These factors are apparently not present in more purified proteins such as egg albumin, casein, fibrin, or purified soybean protein.

6.193

twice as much gain as was obtained with 13.75 micrograms of vitamin B_{12} per kilogram.

With vitamin B_{12} in the ration, dried whole liver, dried liver extract, fish solubles, and dried whey produced greater gains than did fish meal and fermentation solubles. Antibiotics, 3-nitro, 4-hydroxyphenylarsonic acid, malt sprouts, liver residue, lyxoflavin, and mucin were inactive as sources of unidentified factors. Furthermore, responses with the grass-juice factor and with orotic acid were small and of doubtful significance.

1.5 FIRST YEAR OF MESH REGULATION IN THE GEORGES BANK HADDOCK FISHERY

Graham, Herbert W. and Premetz, Ernest D. (U. S. Fish and Wildlife Service)
Special Scientific Report - Fisheries No. 142, United States Department of the Interior, Fish and Wildlife Service, Washington, D. C. (January 1955), 26 pp.

From growth rates and mortality rates of the Georges Bank stock, it was calculated that the fishery would be most productive, with the present size of fleet, if the haddock were not taken until they were three-years old. Since haddock of this age are of marketable size, the initial effects of an advance to this age of first capture might be severe. Consequently, it was decided to recommend increasing the mesh size in two steps. The first step -- advancing the age of first capture to 2 1/2 years -- was to prevent capture of most of the fish normally caught and discarded, while permitting the escape of a very small percentage of the smallest marketable sizes. This step called for the use of nets of 4 1/2-inch mesh, inside stretched measure.

The purpose of the present paper is to report upon the quantities of small fish protected by the regulation and to present an evaluation of its effects upon the quantities and sizes of fish landed from Georges Bank during its first year of operation.

The following are the authors' conclusions:

1. The large-mesh nets were more efficient in capturing large fish. This increased efficiency more than compensated for the reduced quantities of small fish taken during three of the four quarters of the first year of regulation.
2. When the haddock fleet converted to large-mesh nets, the dominant year class was composed

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 ABSTRACTER: F. Bruce Sanford

1.0119 ADDITIONS TO U. S. FLEET OF FISHING VESSELS

Anonymous
Commercial Fisheries Review 17, No. 3, 24 (March 1955)

During 1954 a total of 717 vessels were documented for the first time as fishing vessels, compared with 729 vessels during 1953. Of the total vessels documented in 1954, 465 were built in 1954, 85 in 1953, and the remainder (167) in years prior to 1953.

Vessels Obtaining Their First Documents as Fishing Craft, December 1954 and Comparisons

Section	December		Total			
	1954	1953	1954	1953	1952	1951
	(Number)					
New England	1	1	23	20	30	36
Middle Atlantic	-	-	15	19	26	34
Chesapeake	2	7	93	83	65	36
South Atlantic	5	16	119	116	89	118
Gulf	7	28	313	264	161	173
Pacific	6	4	117	164	203	284
Great Lakes	1	-	6	7	13	25
Alaska	1	1	27	53	88	71
Hawaii	-	-	1	3	-	3
Puerto Rico	-	-	2	-	-	-
Unknown	-	-	1	-	-	-
Total	23	57	717	729	675	780

Note: Vessels assigned to the various sections on the basis of their home port.

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 ABSTRACTER: Kathryn L. Osterhaug

1.3 EARNINGS SURVEY

Anonymous
Western Fisheries 49, No. 5, 12-16, 48-49 (February 1955)

The data given in this article were taken from a 55-page report called "Economic Survey of Salmon Fishermen in B. C." The article gives detailed information on the 1953 earnings of four types of salmon fishermen: gill-netters, trollers, seine crewmen, and seine captains.

Analyses are presented of 89 gill-net records, 89 troll records, 53 seiner crewmembers' records, and 37 seine captains' records. Data are given on such items as capital investment -- boat, gear, and other equipment; total receipts -- salmon, other fish; collecting; other fishery income; chartering -- vessels, gear; total cash operating receipts; total cash operating expenses; income from other occupations; social security; other income; total net income; and total net income less depreciation.

The average total net incomes and range of earnings are given in the bar graph on the reverse side of this card.

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 ABSTRACTER: F. Bruce Sanford

1.86 NEW METAL CRAB FLOAT

Anonymous
Southern Fisherman 15, No. 2, 88-89 (February 1955)

An all-metal float for ripening soft crabs is now available. Light in weight, durable, and virtually unsinkable, the float is buoyed by a series of pontoons. Since these pontoons are adjustable, the depth of water within the float can be regulated to assure maximum protection, circulation, and insulation. The float is eel-proof.

In the development of the float, the construction principles used were based on findings of oceanographers and biologists with reference to the circulation of ocean water and its effect on marine life. The float has a series of staggered louvers on all sides for the purpose of assuring a continuous flow of water in and out of the float, regardless of the rise and fall of tides or variations in the direction of currents.

This constantly changing water supplies fresh food and reduces stagnation and souring. The circulating water also reduces contamination in the float when the crabs begin to shed. The float performed satisfactorily when tested on Maryland's Eastern Shore.

Only two men are required for launching or for beaching. The float is made of hot double-dipped sheet steel, with a non-rust ground coat and a finish coat of synthetic plastic enamel. It is designed to last from 5 to 7 years with normal care.

The float is 44 inches wide, 18 inches deep, and available in 10- and 12-foot lengths. Custom sizes are also available. The estimated shipping weight of standard sizes is 110 pounds.

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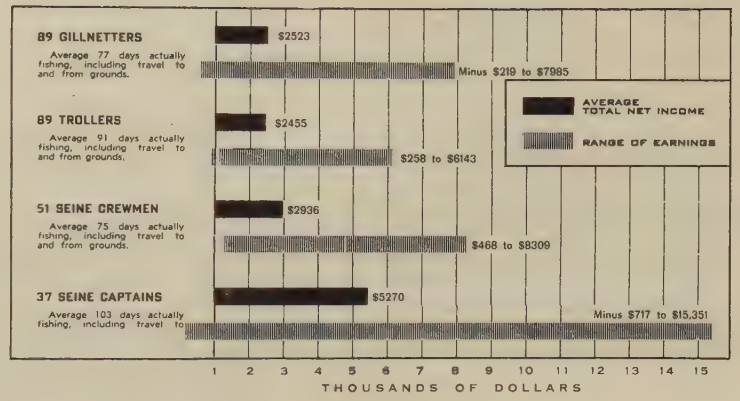
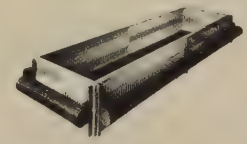
 ABSTRACTER: F. Bruce Sanford

1.3 (Cross References: 9.2, 1.0111)


89 GILLNETTERS
Average 77 days actually fishing, including travel to and from grounds.
$2523
Minus $219 to $7985
89 TROLLERS
Average 91 days actually fishing, including travel to and from grounds.
$2455
$258 to $6143
51 SEINE CREWMEN
Average 75 days actually fishing, including travel to and from grounds.
$2936
$468 to $8309
37 SEINE CAPTAINS
Average 103 days actually fishing, including travel to
$5270
Minus $717 to $15,351
AVERAGE TOTAL NET INCOME
RANGE OF EARNINGS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
THOUSANDS OF DOLLARS

1.86

Among the advantages claimed for the float are virtual elimination of time spent in beaching, cleaning, drying, and relaunching during the active season; reduction of mortality rates; and reduction of losses from capsizing, swamping, and sinking.



1.5

of 3-year-old fish, which were mostly above the selection range of the net. Consequently, few fish were lost. On the other hand, the increased efficiency of the net in capturing larger fish resulted in greater landings than would have been made with the small-mesh nets.

3. This situation continued until the last quarter of the year, when the next dominant year class entered the fishery. Since this group was composed of sizes lying within the selection range of the regulation net, and since the fleet concentrated on these small fish, the landings were reduced.

4. It is estimated that 12 1/2-million haddock have been protected by the large-mesh nets during the first year of regulation. It is too early to measure the benefit to the fishery of the saving of these small fish, but the long-term benefit is expected to be greater than originally estimated. This benefit will be in addition to that resulting from the increased efficiency of the large-mesh nets.

1.0119 (Cross Reference: 1.0112)

Vessels Obtaining First Documents as Fishing Craft 1937-54

Year	Number	Year	Number
1954	717	1945	741
1953	729	1944	635
1952	675	1943	358
1951	780	1942	358
1950	812	1941	354
1949	1,002	1940	320
1948	1,184	1939	357
1947	1,300	1938*	376
1946	1,085	1937	335

* Partly estimated

3.237 PLANT FOR THE PRODUCTION OF FROZEN BREADED SHRIMP AND FISH STICKS

Lawler, Frank K. (Editor, Food Engineering)
Food Engineering 27, No. 2, 72-76, 118-121 (February 1955)

A detailed description is given of a plant that produces frozen and breaded shrimp and fish sticks at St. Simons Island, Georgia. This plant and three other affiliates (at Valona-by-the Sea, Georgia; Fortune, Newfoundland; and Tampa, Florida) have a total freezing capacity of 25 to 30 million pounds a year. The operation at St. Simons Island is as follows:

Shrimp. -- Iced fresh shrimp are washed, inspected, and mechanically graded into four sizes. They then go to automatic peeling and deveining machines from which they are carried by water flume to a series of three spray-wash belts, the last discharging onto inspection belts.

Conveyors now move the shrimp (in pans) to a pinning line, where the tail of each shrimp is slipped over a pin in a metal bar in a rack. The tail-suspended shrimp are dipped in batter and then transferred to a box and covered with breading mix. They next go into an air-blast tunnel at -60° F.

After being frozen, the shrimp are knocked off the pins and sent by conveyor to girls who weigh them into cartons. Finally, the cartons are machine wrapped, placed in shipping cases, and trucked to sub-zero storage.

Fish sticks. -- Blocks of frozen fillets are run through a band saw, and the resulting slabs pass into a machine having a reciprocating knife that cuts them into sticks.

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 ABSTRACTER: F. Bruce Sanford

3.19 EFFECTS OF CATHODE-RAY IRRADIATIONS

Proctor, Bernard E. and Karel, Marcus (Massachusetts Institute of Technology, Cambridge)
Modern Packaging 28, No. 6, 137-139, 188 (February 1955)

Research has indicated that sterilization of foods by ionizing radiations may soon become a reality. One of the problems, however, is the possible effect of the radiations on the packaging materials. The present paper therefore reports the results of an investigation into the functional properties of food-packaging materials irradiated with sterilizing doses of cathode rays.

The radiation source was a Van de Graaf electrostatic generator producing a beam of accelerated electrons of uniform energy. The doses applied were considerably in excess of those that have been reported to be necessary for the destruction of bacteria and insects.

The authors found that the water-vapor permeability and the greaseproofness of nine standard packaging materials were not affected by cathode-ray irradiations at a dose level of 3.5-million rep.

The oxygen permeability of polyethylene film was not significantly changed by exposure to 3-million rep.

Of five packaging materials tested for tensile strength, only one (a coated cellophane sample) showed a decrease in this function following irradiation with 3.5-million rep.

The heat-seal strength of two packaging materials (aluminum-kraft and polyethylene-kraft) was unaffected by irradiation with 2-million rep. No significant variations were found between different portions of the same sample and between different samples.

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 ABSTRACTER: F. Bruce Sanford

3.23 BRINE DIPPING OF HADDOCK FILLETS

Pottinger, S. R. (U. S. Fish and Wildlife Service, East Boston, Massachusetts)
Fishing Gazette 72, No. 3, 35, 68 (March 1955)

Fillets of lean fish are dipped in a weak brine as a standard part of the filleting process. The brining process is intended to (1) wash the fillets, (2) decrease the amount of liquid or free drip that comes from frozen fillets when being thawed, and (3) improve the flavor of the fillets by the addition of a small amount of salt.

As a part of a study of the problems involved in the brine freezing of fish at sea and the subsequent thawing, filleting, and refreezing of the fish, a study was initiated to determine the effects of brine dipping upon fillets prepared under these conditions.

Studies on fillets from iced fish were also included in the study in order to gain comparative information and to answer questions on the subject for industry. The work was limited to haddock and scrod-haddock fillets.

Experimental procedures. -- Fillets were cut from fresh, eviscerated fish which had been held in ice for periods of less than 1 day to as long as 10 days and from brine-frozen whole fish stored at 0° F. for 1 week and for about 18 weeks. The brine-frozen fish, frozen aboard the experimental trawler Delaware, were thawed in running water prior to being filleted.

Tap water and salt solutions containing 0.8, 5, 10, 15, 20, and 26 percent salt by weight were used for dipping the fillets. A 20-second dipping period was used as it was thought to represent the commercial practice for haddock fillets. An exception to this practice was a series designed to show

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 ABSTRACTER: Kathryn L. Osterhaug

3.234 FREEZING AND COLD STORAGE. PHYSICAL FACTORS AFFECTING THE FREEZING PROCESS

Anonymous
Report of the Food Investigation Board (Great Britain) for the Year 1953, 26-27 (1954)

The following factors are significant in freezing blocks of fish fillets in a cold-air blast: air temperature, air speed, air turbulence, evaporative losses from exposed surfaces, block thickness and shape, initial fish temperature, and, possibly, relative humidity. The effect of each of these variables is now being studied. One of the studies that is almost complete is concerned with the effect of air-temperature variations on the freezing times of "infinite" slabs of a given thickness. In this study, evaporation losses were suppressed and the surface-heat-transfer coefficient was maintained constant by the use of metal cover plates.

Two time intervals are important to the operator during the quick-freezing process: One of these is the over-all time that the fish is in the freezer; the other is the time of "thermal arrest." Thermal arrest can be described as the time required for the center of the fish to pass from 0° to -5° C. It is recommended that this time should not exceed 2 hours, and that the unloading temperature of the frozen fish should not be more than -20° C. These two time intervals are related in a complex way. The effect of the temperature of the fish when put into the freezer upon these two time intervals is now being thoroughly studied for the first time.

To devise means of avoiding poor air flow and regions of laminar flow and to achieve uniform turbulent flow over the tray surface in tunnel freezing, the research workers have used a small smoke tunnel. Work with this tunnel has yielded visual flow patterns around models that represent trays of fish in an air-blast freezer. This study has indicated the amount of space that is necessary

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 ABSTRACTER: Martin Heerdt

3.23

the effect of variation in immersion time. In this case, the fillets were dipped for 5, 10, 30, 60, and 120 seconds.

A weighed group of fillets was immersed in brine, agitated gently, removed, drained, and reweighed. The fillets were wrapped in cellophane and frozen. All samples were held for 3 weeks before any tests were made on them.

Weight increase. -- All of the experimentally brined fillets gained in weight. The two major factors responsible for the gain in weight were the length of time the fillets were immersed and the size of the individual fillets. The longer the immersion time, the greater was the gain. Fillets from large haddock gained 30 to 50 percent less weight than did the fillets from scrod haddock.

Brine strength was largely responsible for controlling the absorption of salt by the fillets. The length of frozen storage prior to filleting was also found to be an important factor. Those which had been frozen for a longer time absorbed more salt.

It was demonstrated that the amount of free drip during thawing can be minimized by brining. The free drip from unbrined fillets was from 4 to 6 percent, that from brined fillets, about 2 percent.

Texture. -- The strength of the brine used for dipping appeared to have no appreciable effect on the texture of the fillets.

Palatability. -- Palatability of very fresh iced fish was not affected materially by salt content. With fillets from fish iced 5 and 10 days, the flavor score decreased as the saltiness increased. The flavor scores for fillets from brine-frozen fish stored for 1 week and for 18 weeks prior to processing showed definite drops when excessive salt was present. When an optimum quantity of salt, 0.9 to 1.2 percent, was present the palatability of both groups of fillets from brine-frozen fish was equal to or higher than those of the freshest fish.

Recommendations. ---A short dip of from 5 to 20 seconds in a 10 percent salt solution is recommended for iced haddock. Fillets from brine-frozen haddock should be dipped for 5 to 20 seconds in a 5 to 8 percent salt solution.

3.234

between the trays so that the flow of air over any one tray or layer of trays will be unaffected by the flow over the adjacent tray or layer of trays. The transition from independent to interdependent air-flow conditions appears to be within the range of shelf spacings now in use.

The thermal conductivity of white-fish muscle has been determined calorimetrically at temperatures varying from -30° to 15° C. Values for the thermal conductivity of fish appear to differ considerably from values for water. The separate effects of mineral, protein, and fibrous matter on the thermal conductivity of white-fish muscle is in the process of being determined.

3.237 (Cross Reference: 1.85)

The sticks are conveyed over an inspection belt, under a recirculating curtain of batter, and into a rotating drum that tumbles breading mix over them. The sticks are then conveyed past inspectors and into an electrically heated deep-fat precooker from which they travel down a conveyor and onto trays mechanically moved into place by a stacker. The trays of sticks are then placed on portable racks and pushed into a cooler to bring them to 70° F.

From the cooler, the trays go to the bottom conveyor on a 3-tier packaging line, in which machine-set-up cartons feed onto the top conveyor. These cartons are hand filled and placed onto the middle conveyor, which takes them through a check-weighing operation to a wrapping machine.

The wrapper discharges cartons onto a belt, and a mechanical pusher shoves them between freezer plates. Simultaneously, frozen cartons are pushed out of the freezer onto a discharge conveyor. The cartons are finally cased and taken to frozen storage.

Illustrations. -- The operations are illustrated with 25 photographs and a 4-page fold-out flow sheet.

Other features. -- Quality is maintained by a technologist who makes daily laboratory tests. A home economist uses the modern kitchen of the plant to develop new recipes for the products.

3.19

Irradiation produced a slight darkening of saran film, ascribable to a decrease in the transmittance of light through the film, especially in the blue region of the spectrum. This decrease was a function of dose. In the range from 0 to 15-million rep, the decrease in transmittance at a wavelength of 400 mμ was only slight at the lower dose levels, but became considerably greater as the dose increased.

The authors concluded that, in general, the irradiation doses of the order of magnitude required to destroy insects in packaged foods will have little or no effect on the functional properties of the flexible packaging materials that they studied.

6.195 AMINO ACID REQUIREMENT OF SWINE

Curtin, L. V. (Buckeye Cotton Oil Company, Cincinnati, Ohio)
Feedstuffs 27, No. 11, 34-36, 38-39 (March 12, 1955)

The borderline or limiting amino acids in swine rations are usually tryptophane, lysine, and methionine. A tankage or meat- and bone-scraps ration is likely to be low in tryptophane. Plant proteins, except soybean-oil meal, are deficient or borderline in lysine. Peanut meal is low in both lysine and methionine, and cottonseed meal may be borderline in lysine.

The apparent borderline deficiencies in the plant proteins emphasizes the importance of proper processing of oil meals to assure the maximum availability of the essential amino acids. Also, the borderline deficiencies of some feeds indicates the importance of using more than one source of protein in swine feeds. Almost any mixture of three or four different feeds that furnish a high enough level of protein will be adequate in amino acid distribution for swine.

Table 1 lists the dispensable, semi-indispensable, and indispensable amino acids in swine nutrition, and table 2 summarizes the amino acid requirements of swine in relation to the protein level of the diet.

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 ABSTRACTER: Kathryn L. Osterhaug

6.193 UNIDENTIFIED FACTOR FOUND IN AUTOCLAVED LITTER

Elam, J. F.; Jacobs, R. L.; and Couch, J. R. (Texas A & M College System, College Station, Texas)
Poultry Science 33, No. 5, 1053 (September 1954)

Eight hundred New Hampshire chicks were randomized into 8 groups of 100 chicks each (50 males and 50 females). The basal diet used in this experiment was composed of 35% soybean oil meal, 60.75% ground yellow corn, and supplemented with the recommended levels of the necessary vitamins and minerals.

Samples of litter were collected from poultry houses where the litter had not been changed for at least three months prior to the collection. The litter samples were suspended (0.350 grams of litter per ml. of water), filtered through cheesecloth and the suspension autoclaved for 15 minutes at 15 pounds of pressure at 121-125° C. The autoclaved litter suspension was added to the basal diet at a level of 8 ml. (which contained 0.350 grams of litter per ml. of water) per pound of feed and was also fed in combination with fish solubles and with a combination of antibiotics.

Weekly fecal microflora counts were made by standard bacteriological techniques, to determine the number of Clostridia and also to determine the antibiotic combination resistant organisms per gram of feces.

Growth was increased by the addition of fish solubles, the antibiotic combination, autoclaved litter suspension and was further increased when the autoclaved litter suspension was fed in combination with fish solubles or with the antibiotic combination.

 Reprinted in whole

6.4 PHOTOCHEMICAL ENGINEERING

Doede, C. M. and Walker, C. A. (Quantum, Inc., Mt. Carmel, Connecticut and Yale University)
Chemical Engineering 62, No. 2, 159-178 (February 1955)

The possibility of applying photochemical methods to the manufacture of various chemicals has excited the imagination of chemical engineers ever since the first researches on this method of increasing reaction rates and causing selected reactions to occur were reported. The unique characteristic of the photochemical activation of chemical bonds is that the process is highly specific.

Thus, if light of an appropriate wavelength is applied to a given molecule, it is frequently the case that the energy level of only one bond in the molecule is increased appreciably. Such behavior is in contrast to the increases in rotational, translational, and vibrational energy levels that usually result from thermal activation of molecules. Photochemical activation is such that it should be possible to activate a single bond in a thermally unstable molecule without causing it to decompose.

There are two distinct characteristics of photochemical activation that are of particular interest in industry: (1) Photochemical activation can be used in certain instances to increase the rate at which a reaction occurs without changing the nature of the products. (2) Photochemical activation can be used to take advantage of its specific effect on the course of a reaction.

The radiation sources of greatest interest in industrial photochemistry are the various mercury lamps.

Few materials are available that have the proper combination of strength and transparency to serve as ultraviolet source sheaths and as photochemical reactors. However, this combination

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 ABSTRACTER: F. Bruce Sanford

6.15 THE CONVERSION OF HERRING STICKWATER TO SOLUBLES. I. THE DECOMPOSITION OF STICKWATER AT HIGH TEMPERATURES

Thomson, W. A. B.; MacLeod, R. A.; and Idler, D. R.
Progress Reports of the Pacific Coast Stations, Fisheries Research Board of Canada, No. 101, 6-9 (December 1954)

Herring solubles is the product that is obtained by removing water from herring press liquor or stickwater. Herring solubles contain 50 percent solids. If the herring press liquor was merely evaporated, the resulting solubles would be very viscous and therefore unsuitable for use in feeding animals. This high viscosity is due to the presence of suspended and dissolved protein in the original stickwater. In British Columbia, the dissolved and suspended protein is coagulated with acid and removed by centrifugation prior to concentration of the stickwater. Stickwater from late winter herring taken in British Columbia has the disadvantage of yielding solubles with too high a viscosity and oil content.

The present studies were made to determine the most suitable means of producing solubles from British Columbia herring stickwater. Enzyme digestion was tried as a means of obtaining suitable herring solubles. This method has the advantage of converting large protein molecules in the stickwater into smaller fragments so the press liquor can be concentrated without an undue increase in its viscosity.

Stickwater that is to be treated with commercially available proteolytic enzymes must not exceed 140° F. This means that the stickwater that leaves the press at 210° F. must be cooled to 140° F. About 48 hours were required for this cooling to take place at one of the British Columbia plants. Slow cooling over a period of 48 hours is accompanied by a considerable loss in total solids and by the

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 ABSTRACTER: Martin Heerdt

6.4 (Cross Reference: 6.138)

transparency is provided by optical glass, pyrex glass, vycor glass, and fused silica. The short wavelength limit in the use of these materials is dependent upon the thickness of the material.

The selection and design of the equipment for carrying out the reactions on an industrial scale involve primarily the following: (1) rate of reaction, (2) phases involved, (3) heat of reaction, and (4) corrosiveness of reactants.

Batch photochemical reactors are used when the production is small and the phases involved are either liquid alone or liquid plus gas. Continuous reactors are used for vapor-phase reactions -- even with those having low production rates -- and for liquid or mixed phase reactions if the production rate is high.

6.15

production of an obnoxious odor.

Because it was not possible to duplicate exact plant cooling conditions in the laboratory, samples of stickwater were held at 140°, 160°, and 180° F. for 48 hours. Nearly 14 percent of the total solids was lost as a result of storage at 140° F., and smaller losses occurred at 160° and 180° F. In other experiments as much as 20 percent of the total solids was lost at 140° F., and there was also a considerable loss at 150° F.

These losses even at the high temperatures were found to be due to the action of bacteria. In an experiment designed to follow the total solids content of a sample of stickwater over a period of 50 hours, the total solids of the stickwater decreased, and the bacterial population increased. A very large increase occurred in the bacterial population between 10 and 20 hours of storage and this increase was accompanied by a considerable loss in solids. After 20 hours, aerobic bacteria could no longer be found. This was believed to be due to the production of anaerobic conditions in the well-filled bottles of stickwater. At the end of 40 hours incubation, the anaerobic bacteria had increased in number from an initial 10 organisms per milliliter to 300 million per milliliter. Checks at 10 hour intervals showed that as the total number of bacteria increased, there was a progressive rise in pH from a low of from 6.2 to 6.5 to a final pH of 7 to 7.5.

Boiling and autoclaving were used to determine their effect upon the bacterial flora of stickwater. Autoclaving at 248° F. for 30 minutes appeared to kill both the vegetative bacterial cells and their spores. This was the only heat treatment that prevented an appreciable loss of solids in stickwater held at 140° F.

To determine the effect of aeration as a means of cooling hot stickwater, a number of samples were aerated at 140° F. for 50 hours. The solids loss which occurred under aeration was about 70 percent of the loss which occurred under anaerobic conditions. It appears, therefore, that the aerobic conditions inhibited the anaerobes and promoted the growth of the aerobes. When the initial pH of the stickwater was adjusted to either pH 5 or 9, the loss of solids did not occur; whereas at an initial pH of 6, 7, or 8, a considerable loss of solids occurred.

6.195

TABLE 1—Amino Acids for Swine

Dispensable	Semi-indispensable	Indispensable
Glycine	Arginine	Histidine
Glutamic acid	Cystine	Isoleucine
Aspartic acid	Tyrosine	Leucine
Alanine		Lysine
Serine		Methionine
Proline		Phenylalanine
Hydroxyproline,		Threonine
		Tryptophan
		Valine

TABLE 2—Amino Acid Requirements of Swine

	Per cent of protein	Per cent of 16% protein ration	Per cent of 35% protein supplement
Arginine	1.8	0.3	0.1
Histidine	1.9	0.3	0.3
Isoleucine	3.2	0.6	0.8
Leucine	6.0	0.8	0.3
Lysine	6.6	0.9	2.3
Methionine	1.5	0.34	0.5
Methionine + cystine	3.2	0.8	1.0
Phenylalanine	3.5	0.4	0.4
Phenylalanine + tyrosine	3.8	0.6	0.4
Threonine	3.0	0.5	1.0
Tryptophan	0.8	0.11	0.23
Valine	3.1	0.5	0.6

1.5 THE SABLEFISH FISHERY

Gharrett, John T.
Pan American Fisherman 9, No. 9, 12-13, 19 (April 1955)

Sablefish (sometimes called black cod, candlefish or coalfish) are found along the Pacific Coast from southern California to Alaska. Although there is an interrelationship between the coastwise sablefish markets, the commercial value of landings varies in different areas.

Sablefish is one of the best fish to smoke, but it is rarely sold fresh because of its high oil content. Small quantities are dry-salted, and some of the fish are frozen. With the large scale production of synthetic vitamin A, there has been a decreased demand for fish livers, including sablefish livers.

Ninety-five percent of the California catch is taken from the Eureka, Fort Bragg and Monterey regions by long-line fleets. The annual return is nearly constant, although there are seasonal fluctuations associated with demand.

The Washington and Oregon fisheries have shown a decline in sablefish. The equipment used in the Washington-Oregon area includes trawls and setlines. The trawl is the most economical as it is not dependent upon one species for its earnings. Seasonal variation in catch is also notable in this region. Measures to stabilize the yield are being considered.

The British Columbia sablefish catch has averaged 2 million pounds, about one-fourth of the total average catch by all divisions. The northern grounds have shown a steady increase. The present fishery in Alaska also shows market fluctuations and variations in cold storage holdings.

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 ABSTRACTER: Lois Elgin

2.2 TAPE RECORDING OF ALARM CALL SUCCESSFULLY SCARES OFF GULLS

Frings, Hubert; Frings, Mable; Cox, Beverly; and Peissner, Lorraine (Department of Zoology and Entomology, Pennsylvania State University, State College)
Maine Coast Fisherman 9, No. 9, 32 (April 1955)

Recent experiments indicate that gulls can be kept away from plants and wharves by playing a tape recording of the gulls' alarm call.

Herring gulls, as well as other sea birds, often become pests by feeding on crops and fish waste destined for chemical conversion. Although many attempts have been made to rid areas of the birds, none has been completely satisfactory.

Noise, as such, does not repell gulls; probably because it has no biological significance. Sounds which have significance for the species to be repelled are more effective. For instance, starlings can be repelled from roosts by broadcasting the recorded distress call of another starling to them.

Herring gulls do not have a distress call -- a call given by an individual who is being restrained or mistreated. They do, however, have an alarm call which they use when they see a captive gull or detect danger. The gulls' reaction to the call is to initially draw near and then slowly leave the area by slowly circling away.

The alarm call consists of two piercing cries in descending sequence followed by from two to five sharp cries. These sounded to the authors like "cut-cut-cut," with the accent on the first note.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

0.12 AUTOMATION -- ONE ANSWER TO HIGH QUALITY IN THE FOOD PLANT

Gould, Wilbur A. (Ohio State University)
Food Packer 36, No. 4, 28, 34 (April 1955)

Automation may be thought of as the measuring and controlling of quality and processing variables according to pre-established specifications. There are three main aspects of automation: (1) The establishment of specifications for quality characteristics and for variables of processing, (2) measuring the characteristics or variables, and (3) the application of instrument controls for the regulation of the variables.

Establishment of specifications. -- Specifications can be expressed as dimensions of speed, time, flow, temperature, texture, and color, among others. These dimensions must be set up as exact quantities if they are to be used with automation to produce uniform, high-quality processed foods.

Measurement. -- The ability to measure is essential to control, and any variable that can be measured can be controlled. According to this theory, it would appear that once the quality-control technologist, working with instruments, has the measuring device, the instrument man can control to given specifications.

Application of instrument controls. -- The two basic classes of automation are mechanical automation and process automation. Because of its important effect on cost and production, mechanical automation receives the greatest emphasis today. Examples of mechanical automation include automatic unloaders, dumpers, continuous weighing devices, size graders and color sorters. To

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 ABSTRACTER: Kathryn L. Osterhaug

2.1121 WOODS HOLE BIOLOGISTS EXPERIMENTING TO FIND BEST MESH SIZE FOR WHITING

Anonymous
Maine Coast Fisherman 9, No. 9, 23-25 (April 1955)

Investigations by fishery biologists at the Woods Hole laboratory have demonstrated that the size of whiting caught by commercial fishermen can be controlled by the use of appropriate mesh size.

New England fishermen recently became concerned about the apparent depletion of the shore stocks of whiting and asked the Fish and Wildlife Service to determine whether a conservation program based on minimum mesh size would be valuable for protecting the species.

Preliminary experiments have been conducted by the North Atlantic Fishery Investigation Laboratory at Woods Hole to discover whether the reaction of whiting to the net and their escape follows the same principles as those found for haddock.

Ordinary whiting nets with various cod ends of different materials and sizes were attached. To find out how many fish of what size escaped through the various parts of the net, the net was covered loosely with shrimp netting. Thus a comparison could be made of the fish retained in the net and those that escaped only to be caught in the finer shrimp netting.

Three different materials in various sizes were used for cod ends to determine not only what difference the mesh size made, but also to see whether the three common materials were interchangeable. It was found that manila, cotton, and nylon of equal mesh size released increasingly

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 ABSTRACTER: Kathryn L. Osterhaug

0.12

qualify as a member of the automation category, a device must embody both mechanical action and control of the rate of action.

Process automation controls such factors as time, temperature, pressure, level, pH, flow, density, viscosity, color, and product formulation. For effective process automation, it is necessary to have standards of quality already established. The automation is then applied both from the standpoint of the measurement of the characteristic and its control within the specification limits.

Advantages of automation. -- The important advantages of automation include the following: (1) The scientific regulation of each process on the production line, (2) the maintenance of uniform product quality, (3) an increase in plant capacity through regulated and controlled flow, and (4) actual reduction in operation costs.

2.1121 (Cross References: 1.9, 9.17)

larger fish.

A table showing the fish counts for two of the experiments demonstrates that the size of the fish captured can be controlled by the proper selection of mesh size. Two cod ends made of cotton were compared in a series of tows.

Mesh size	Dressed Weight (lbs)	Length (in)	No. in Cover	No. in Cod End	Total
3½"	up to .08	up to 8.3	1124	616	1740
"	.11 to .44	9.5 to 14.2	435	3717	4152
"	over .59	over 15.4	0	230	230
4½"	up to .08	up to 8.3	1116	193	1309
"	.11 to .44	9.5 to 14.2	2063	1832	3895
"	over .59	over 15.4	145	867	1012

1.5

Tagging experiments were devised to facilitate the proposed management of this fish. California, Oregon, and Washington cooperated in this project which enabled the researchers to discover the amount of movement in the sablefish stocks. Of the fish recovered, most of them were found near the region of release (within 30 miles), with only a few fish making extensive migrations. The tagged fish were found scattered throughout the depths fished, and there seemed to be no relationship between size of fish and direction and extent of migration. The sablefish in Washington offshore waters appeared to grow faster than the California or Oregon fish. Since the percent of recovery was small and seemed to be related to the estimated condition of the fish at tagging, this experiment does not appear to be conclusive.

2.2

This call, as given by gulls free in the air, was put on a tape recorder. Each unit was of about 5-seconds duration. Recordings of any desired length were made by repeating all or part of the call with intervals of 5 to 10-seconds of silence. The recordings were broadcasted to the gulls through an amplifier and loudspeaker.

The gulls react to the sound by rising in the air when they hear the attention call and approaching the speaker when the alarm notes sound. They then circle slowly around and leave.

The call was tested on gulls feeding on 3 dumps, a sardine cannery, a fish-meal factory, and on the seashore. At an intensity of 95 decibles and a distance of 1 meter from the speakers, the call was effective in lifting all gulls within a radius of one-half mile. The gulls remained away for an average of 30 to 45 minutes.

2.02 BIOCHEMICAL STUDIES ON THE PEARL OYSTER, PINCTADA MARTENSI

Ashikaga, Chie
J. Agr. Chem. Soc. Japan 23, 63-8 (1949)
Chemical Abstracts 44, No. 16, 7452 (1950)

II. Changes of glycogen content during the process of preservation
III. The glycogen content in relation to the portions and to sexes

2.02 THE RELATION OF TENDERNESS TO PROTEIN ALTERATIONS DURING POST MORTEM AGING

Wierbicki, Eugen; Kunkle, L. E.; Cahill, V. R.; and Deatherage, F. E.
Food Technology 8, No. 11, 506-511 (November 1954)

(Abstract of this article appears under 0.32 page 13 - March 1955 issue)

2.02 ACTOMYOSIN REACTIONS

Robb, Jane Sands
Federation Proceedings 13, No. 1, Part I, 118-119 (March 1954)

2.05 FOOD POISONING CAUSED BY ORDINARY PUTREFACTION

Miyaki, Komei and Kayashi, Makoto
J. Pharm. Soc. Japan 74, 1145-51 (1954)
Chemical Abstracts 49, No. 5, 3436 (1955)

III. Detection of histamine and its synergistic factor in deteriorated dried mackerel-pike. 1.
IV. Synergism between histamine and several biogentic amines

2.05 FORMATION OF TOXIN BY STAPHYLOCOCCUS IN VARIOUS FOOD PRODUCTS

Turzhetskii, K. I.
Gigiena i Sanit., No. 6, 34-8 (1949)
Chemical Abstracts 43, No. 19, 7601 (1949)

Incubation at 37° for 24 hrs. causes the greatest multiplication of staphylococci on egg products, followed in descending order by ice cream, fish, milk, and meat.

2.05 B. PROTEUS AS THE BASIC CAUSE OF FOOD POISONING BY CRAB MEAT

Timofeeva, L. A.
Gigiena i Sanit., No. 6, 40 (1949)
Chemical Abstracts 43, No. 19, 7602 (1949)

Bacteriol. analysis of crab specimens and human patient stomach content samples indicates that B. proteus is chiefly responsible for the food poisoning after ingestion of spoiled crab meat.

2.1121 CABLE MEASURING DEVICE TESTED BY TRAWLERS

Anonymous
Pacific Fisherman 52, No. 10, 29 (September 1954)

A new cable measuring device has been undergoing tests aboard several Seattle trawl vessels. The present model measures the cable by a friction wheel which rides the trawl wire. The instrument may be clamped to the wire at any desired location. Cable readings are given in fathoms on a counter. Further tests are to be conducted.

2.1121 LARGE MESH OTTER TRAWLS

Anonymous
Trade News 6, No. 12, 6 (June 1954)

2.1121 MECHANICAL ACTION OF THE OTTER BOARD OF THE TRAWL NET

Kawakami, Tasae
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 4, 228-32 (August 25, 1953)

2.118 FISH-RESIDUE PROCESSING PLANT FOR INSTALLATION ABOARD SHIPS

Napier, Melvin J.
U. S. patent 2,468,636 (April 26, 1949)
Chemical Abstracts 43, No. 16, 6437 (1949)

2.118 REFRIGERATION OF TUNA AND SARDINES BY SODIUM CHLORIDE BRINES

Farber, Lionel
Food Technology 9, No. 3, 141-147 (March 1955)

(Abstract of this article appears under 2.15 page 19 - May 1955 issue)

2.118 "FAIRTRY" ARRIVES BACK HOME

Anonymous
Canadian Fisherman 41, No. 9, 28-29 (September 1954)

The article reports on the success of the first voyage of the new and unique factoryship Fairtry. Fish were filleted, packaged and frozen within twelve hours of catching. The three-month voyage to the Grand Banks and Greenland netted 290 tons of fillets, 170 tons of mixed whole fish, 86 tons of fish meal and 4,200 gallons of liver oil.

2.14 FRESH WATER BY DISTILLATION

Anonymous
Food Manufacture 30, No. 4, 136 (April 1955)

Admiralty chemical engineers have recently made a great improvement in the efficiency and economy of water distillation by inventing a compound that prevents salt build-up on evaporator surfaces and consequent rapid drop in output. Used on the Royal tour ship Gothic, the compound raised evaporator output from 10 to 32 tons/day.

2.14 ANALYSIS OF THE HAWAIIAN LONG-LINE FISHERY, 1948-52

Otsu, Tamio
Commercial Fisheries Review 16, No. 9, 1 (September 1954)

2.14 DRUM SEINING--A NEW DEVELOPMENT IN THE PUGET SOUND SALMON FISHERY

Smith, Keith A. (U. S. Fish and Wildlife Service)
Commercial Fisheries Review 16, No. 2, 1-10 (February 1954)

2.3 PROCESSING OF SHRIMP

Garnatz, George; Volle, Norbert H.; and Deatherage, Fred E.
U. S. patent 2,488,184 (November 15, 1949)
Chemical Abstracts 44, No. 4, 1623 (1950)

The yield and the quality of the product are improved by soaking the raw shrimps in a 0.5 to 2.5% soln. of alkali metal or NH_4 di- or tribasic phosphate, metaphosphate, pyrophosphate, tartarate, citrate, or carbonate.

2.3 REFRIGERATION OF TUNA AND SARDINES BY SODIUM CHLORIDE BRINES

Farber, Lionel
Food Technology 9, No. 3, 141-147 (March 1955)

(Abstract of this article appears under 2.15 page 19 - May 1955 issue)

2.3 HOW TO MAKE UP CONTROL CHARTS FOR AUTOMATIC SCALES

Rudd, John K.
Feedstuffs 27, No. 1, 10-11, 43 (January 1, 1955)

(Abstract of this article appears under 6.130 page 19 - April 1955 issue)

2.8 ABUNDANCE FROM THE SEA

Anonymous
Practical Home Economics 33, No. 7, 18 (March 1955)

2.8 SOME FACTORS AFFECTING THE DECOMPOSITION OF FRYING FATS

Carlin, G. T.; Hopper, R. P.; and Rockwood, B. N.
Food Technology 8, No. 3, 161-165 (March 1954)

(Abstract of this article appears under 4.4 page 1 --November 1954 issue)

2.8 FATTY ACID CONTENTS OF SELECTED FOODS BEFORE AND AFTER COOKING

Anonymous
Nutrition Reviews 11, No. 8, 255-256 (August 1953)

(Abstract of this article appears under 0.6 page 9 - December 1953 issue)

2.9 STUDIES ON SHARK MUSCLE. PART 4. ON HISTAMINE IN SHARK MEAT

Ohoishi, Keiichi
Bulletin of the Faculty of Fisheries, Hokkaido University 4, No. 2, 119-122 (August 1953)

"Histamine poisoning does not occur from shark meat regarded usually to be in an edible state."

2.9 NUTRITIVE VALUE OF FISH FROM MICHIGAN WATERS

Ingalls, Ruth L.; Klocke, Jessie Finley; Rafferty, Joan Plummer; Greensmith, R. Ellen; Li Chang, Miranda; Tack, Peter I.; and Ohlson, Margaret H.
Michigan Agr. Expt. Sta. Tech. Bull., No. 219, 244 pp. (1950)
Chemical Abstracts 45, No. 8, 3523 (1951)

2.9 FOOD POISONING BY PLANTS AND ANIMALS

Walden, O. W.
Food 21, 9-12 (1952)
Chemical Abstracts 46, No. 7, 3169 (1952)

4.5 EFFECT OF REFINING ON OXIDIZABILITY OF UNSATURATED FATS AND OILS

Taufel, K. and Nazli, A. Hayaar
Deut. Lebensm. -Rundschau 44, 157-60 (1948)
Chemical Abstracts 44, No. 21, 10351 (1950)

4.5 STUDIES ON A KIND OF DISCOLORATION OF FISH-OIL. X.

Nonaka, Junsaku
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 4, 319 (1954)

The author reports that the usual permanent discoloration of aero-oxidized oleic acid is nothing but the discoloration of acid carbonyl compounds, i.e., aldehydic- or ketonic acids, as a constituent of the so-called oxidized acids born in the oleic acid.

4.5 SOME PROPERTIES OF OXIDIZING FISH OIL CONCERNING TO ITS CONDITION OF OXIDATION

Ando, Kazuo
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 11, 1069 (1954) (English summary and tables)

"When oily fishes are dried and stored they suffer rusting, often becoming a little rancid. The difference in chemical mechanism between "rancidity" and "rusting" of fish oil is discussed.

4.5 SPOILAGE OF FATS AND OILS. II.

Iselin, Ernst
Mitt. Gebiete Lebensm. Hyg. 39, 310-36 (1948)
Chemical Abstracts 43, No. 8, 3216 (1949)

The process of spoilage of veal, mutton, beef, and pork fat is discussed. The fats were exposed for 2-3 yrs. to diffuse daylight and the process of oxidation was checked every 3 months. A detailed discussion of the results and theory of fat oxidation is given.

4.5 CHEMICAL TECHNOLOGY OF SOUPFIN-SHARK LIVER OIL. II. EFFECTS OF STORAGE CONDITIONS ON STABILITY

Lategan, A. W.
J. S. African Chem. Inst. 1, 95-110 (1948)
Chemical Abstracts 43, No. 22, 9380 (1949)

4.5 RELATION OF ODOR, PEROXIDE, ALDEHYDE, AND ACID CONTENT OF RANCID LARD

Hamm, Volker
Deut. Lebensm. -Rundschau 44, 161-2 (1948)
Chemical Abstracts 44, No. 21, 10203 (1950)

4.62 GALLIC ACID ESTER ANTIOXIDANTS FOR FISH OILS

Bittenbender, C. D.
Comm. Fisheries Rev. 12, No. 2, 1-18 (1950)
Chemical Abstracts 44, No. 19, 9168 (1950)

4.62 STUDIES ON COMPONENTS IN DRY DISTILLATION PRODUCTS OF SOME FISH SCRAP (1)

Saito, Tsuenyuki; Yokoyama, Akira; and Matsuoka, Yoshitaka
Bulletin of the Faculty of Fisheries, Hokkaido University 5, No. 1, 73 (May 1954)

Dry distillates of fish scrap were studied for their antioxidant activity toward vitamin A in fish-liver oil.

4.62 STUDIES ON THE PREVENTING OXIDATION OF FISH OILS AND FISH PRODUCTS. I. EFFECTS OF BUTYLHYDROXYANISOLE (B.H.A.) ON FISH OILS

Otani, Shigeru; Takayanagi, Ken; and Matsuhashi, Tetsujiro
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 9, 947 (1954) (English summary, tables, and figure)

"B.H.A. in proportion of 0.02% to the sardine oil, is very effective to prevent the oxidation of the oil stored under various conditions."

4.62 MANUFACTURE OF PRESERVED MARINE FOOD PRODUCTS. V. INFLUENCE OF A SMUDGE TREATED WITH CORONA DISCHARGE UPON FISH OIL

Tanikawa, Eiichi and Akiba, Minoru
Oyo Kingaku 3, 81-7 (1949)
Chemical Abstracts 44, No. 19, 9180 (1950)

4.62 CHEMICAL TECHNOLOGY OF SOUPFIN-SHARK-LIVER OIL. I. STABILITY STUDIES AND THE USE OF ANTIOXIDANTS

Lategan, A. W.
J. S. African Chem. Inst. 1, 39-60 (1948)
Chemical Abstracts 43, No. 9, 3567 (1949)

4.62 STABILIZATION OF PROVITAMIN A

Petering, Harold G. and Petering, Wilbur H.
U. S. patent 2,482,635 (September 20, 1949)
Chemical Abstracts 44, No. 1, 246 (1950)

The provitamins A in dried animal feeds are stabilized against deterioration by treatment with low-boiling org. solvents and vegetable oils.

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

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Analytical Chemistry
Archives of Biochemistry and Biophysics
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemistry and Industry
Commercial Fisheries Review
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fisherman
Fishing Gazette
Flour and Feed
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Science Abstracts
Food Technology
Frosted Food Field
Industrial and Engineering Chemistry
Industrial Refrigeration
Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Home Economics
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Meldinger Fra SSF (Herring Industry, Norway)
Modern Packaging
Modern Refrigeration
National Fisherman
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

4.63 EVALUATION OF ANTIOXIDANT ACTIVITY BY STABILIZATION OF VITAMIN A AND CAROTENE

Lips, H. J. and McFarlane, W. D.
Can. J. Research 28F, 157-65 (1950)
Chemical Abstracts 44, No. 22, 11032 (1950)

4.63 OXIDATION OF VITAMIN A IN THE OIL EXTRACTED FROM THE LIVER OF THE TUNNY AND ITS STABILIZATION WITH NORDI-HYDROGUAIARETIC ACID

Buffa, Aldo
Conserve e deriv. agrumari (Palermo) 1, 9-13 (1952)
Chemical Abstracts 46, No. 21, 10550 (1952)

4.63 ANTIOXIDANTS FOR VITAMIN A IN FISH-LIVER OILS. 1. ANTIOXIDATIVE PROPERTIES OF HYDROXYCOUMARINS

Kawai, Tomohiko; Shimizu, Tsuenkazu; and Suzuki, Mieko
J. Pharm. Soc. Japan 72, 553-6 (1952)
Chemical Abstracts 46, No. 18, 8809 (1952)

4.64 SOYBEAN"LECITHIN" AND ITS FRACTIONS AS METAL-INACTIVATING AGENTS

Evans, C. D.; Cooney, Patricia M.; Scholfield, C. R.; and Dutton, H. J.
J. Amer. Oil Chemists' Society 31, No. 7, 295-97 (July 1954)

"The addition prior to deodorization of 0.1% of either crude phosphatides, or the alcohol-soluble, or the alcohol-insoluble fraction all improved the oxidative stability and the initial flavor of soybean salad oil."

4.64 A STUDY OF THE ANTIOXIDANTS OF NATURAL SPICES

Chipault, J. R.
Annual Report of the Hormel Institute, University of Minnesota, 23-26 (1953-54)

Cloves in oil-in-water emulsions gave protection against oxidation for an unusually long time. Four spices have been examined in French dressing. Oregano had the highest antioxidant index in mayonnaise. Fractions with high antioxidant power have been isolated from sage and oregano.

4.64 INVESTIGATION OF SOLVENTS FOR THE INCORPORATION OF ANTIOXIDANTS IN FATS

Privett, Orville S.
Annual Report of the Hormel Institute, University of Minnesota, 41-42 (1953-54)

Since selachyl alcohol occurs naturally, since it is odorless, colorless, and soluble in fats, and since it dissolves both antioxidants and synergists, it appears to be an ideal solvent for the incorporation of antioxidants in fat.

4.90 ANNUAL REVIEW OF LITERATURE ON FATS, OILS, AND SOAPS. II.

Piskur, M. M.
Journal of the American Oil Chemists' Society 31, No. 6, 236-253 (June 1954)

The food value of fish oils as measured by in vitro digestion experiments (Sasaki et al. -- J. Japan. Soc. Food & Nutr. 3, 139) and growth of rats (Higashi & Kaneda -- Bull. Japan. Soc. Sci. Fisheries 16, 311) was lowered by deodorization with the aeration processes. Japansese margarine is poorer than butter for supporting reproduction in the mouse (Mori -- Med. & Biol. Japan 26, 124). The severe muscular dystrophy that develops in calves given cod-liver oil is attributed to a general effect of polyunsaturation (Blaxter et al. -- Brit. J. Nutr. 7, 287).

4.90 HIGH-FAT, HIGH-PROTEIN BROILER RATION

Anonymous
Feedstuffs 27, No. 6, 1, 79 (February 5, 1955)

(Abstract of this article appears under 4.82 page 11 - May 1955 issue)

4.91 STUDIES ON THE NUTRITIVE VALUE OF LIPIDS. X. SEBORRHEA FORMING ACTIVITY OF ESTERS OF FATTY ACIDS WITH HIGHER ALCOHOLS UPON THE RATS (1)

Kaneda, Takashi and Sakurai, Hisae
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 12, 1168 (1954)

"Sperm whale oil, the esters of fatty acids with oleyl- and cetyl-alcohol, sperm-whale oil and oleyl oleate had seborrhea-producing activity upon rats."

4.92 THE INFLUENCE OF HEATING CODLIVER OIL TO 230° ON THE GROWTH OF YOUNG RATS. I.

Groot, E. H. and Kleinobbink, H. J.
Voeding 14, 123-36 (1953)
Chemical Abstracts 47, No. 10, 4973 (1953)

A diet consisting of 66 ground rice, 10 casein, 10 dried yeast and 4 parts salt mixt. was used. When 10% of codliver oil of peroxide value <24 (I) was added, normal growth occurred. When the peroxide value was >54 (II), a significant decrease of growth occurred. Female rats were used. Oil-sol. vitamins were given weekly per os. Growth was practically normal again when II was heated previously for 3 hrs. at 230° in vacuo. The peroxide value dropped considerably; about 2% dist. off. The distillate was not toxic. By heating a complete change of the ultraviolet spectrum occurred both in I and II. α-Tocopherol had no effects on the decreased growth with II.

4.92 STUDIES ON ENCEPHALAMALACIA IN THE CHICK. 1. THE INFLUENCE OF A VITAMIN E DEFICIENCY ON THE PERFORMANCE OF BREEDING HENS AND THEIR CHICKS

Singsen, E. P.; Matterson, L. D.; Kozeff, Anna; Bunnell, R. H.; and Jungherr, E. L.
Poultry Science 33, No. 1, 192 (January 1954)

(Abstract of this article appears under 5.7 page 19 - March 1955 issue)

4.92 ANTIVITAMIN ACTION OF FISH LIVER OILS

Cormier, Marcel
Bull. soc. chim. biol. 30, 921-40 (1948)
Chemical Abstracts 43, No. 15, 5834 (1949)

INDEX

Subject	Page No.	Card No.
Analysis, organic		
Spectrophotometric analysis of fats	9	4.11
Use of complexes in organic analysis	9	4.11
Antioxidants		
Stabilization of provitamin A	25	4.62
Use of antioxidants in liver oil	25	4.62
Treatment of fish oil with a smudge	25	4.62
Antioxidant action of B.H.A.	25	4.62
Antioxidant from fish scrap	25	4.62
Gallic acid ester antioxidants	25	4.62
Vitamin A antioxidant	27	4.63
Stabilization of vitamin A	27	4.63
Soybean "lecithin" as antioxidant	27	4.64
Antioxidants of natural spices	27	4.64
Solvents for antioxidants	27	4.64
Apparatus and equipment, laboratory and plant		
Automation in food plants	19	0.12
Byproducts, miscellaneous		
Photochemical engineering	17	6.4
Chemistry and biochemistry, miscellaneous		
Countercurrent distribution	1	0.32
Fat-protein copolymerization	1	0.33
Muscle physiology and biochemistry	1	0.36
Cod family		
Mesh regulation in haddock fishery	13	1.5
Sablefish fishery	19	1.5
Cookery		
Abundance from the sea	23	2.8
Crab		
New metal crab float	13	1.86
Dried and dehydrated fish		
Fish dehydration	7	3.6
Economics and statistics		
Shrimp-boat financing	5	2.6
Factory ships		
Successful voyage of factoryship	21	2.118
Fish-residue processing plant	21	2.118
Fish meal, nutritive value		
Fat-deposition factor	11	6.190
Methionine added to fish-meal rations	11	6.190
Unidentified factors in fish meal	11	6.193
Growth factor in litter	17	6.193
Amino acid requirements of swine	17	6.195
Fish meal and oil, manufacture		
Decomposition of stickwater	17	6.15
Fishery biology and fish culture		
Iodine in young salmon	29	9.13
Metabolic products of fish	29	9.13
Oxygen uptake of the lobster	29	9.13
Pulp mill wastes vs. shellfish	29	9.19
Effect of kraft pulp mill wastes	29	9.19
Toxicity of ferricyanide solutions	29	9.19
Fishing concerns and agencies		
Development of seafood organization	29	9.4
International fishery commissions	29	9.4
Fishing methods		
Hawaiian long-line fishery	23	2.14
Drum seining	23	2.14
Frozen fish, general		
Corrosion reduction in brine systems	7	3.231
Frozen fish, changes in during freezing and cold storage		
Freezing effect on fish muscle	7	3.239
Frozen fish, processing		
Freezing fish at sea	5	2.118
Brining of fillets	15	3.23
Factors affecting the freezing process	15	3.234
Breaded-shrimp-and-fish-stick plant	15	3.237
Gear, fishing		
Atom-line trailing	5	2.1123
Hydraulic deck-equipment	5	2.114
Mesh size for whiting trawl	19	2.1121
Action of the otter board	21	2.1121
Large mesh otter trawls	21	2.1121
Device for measuring cable length	21	2.1121
Handling fresh fish		
Scaring off gulls	19	2.2
Processing of shrimp	23	2.3
Marine plant products		
Ion-exchange properties of agar	11	6.3
North American, Alaskan fisheries and U. S. territories		
Additions to U. S. fishing fleet	13	1.0119
Nutritional value of fish and toxicity		
Histamine in shark meat	23	2.9
Food poisoning	23	2.9
Nutritive value of fresh-water fish	23	2.9
Oceanography		
Weather vs. catch	29	9.11
Direction of travel of sea waves	29	9.11
Oils, chemical and physical properties		
Fatty acid constituents of squid oil	9	4.19
Oils, nutrition		
Fish oil in poultry rations	9	4.90
Food value of fish oils	27	4.90
Nutritive value of lipids	27	4.91
Effect of heating cod-liver oil	27	4.92
Antivitamin action of fish-liver oil	27	4.92
Preserved fish, miscellaneous		
Effects of cathode-ray irradiations	15	3.19
Rancidity		
Odor, peroxide, aldehyde, and acid	25	4.5
Spoilage of fats and oils	25	4.5
Soupfin-shark-liver-oil stability	25	4.5
Rancidity vs. rusting of fish oil	25	4.5
Effect of refining	25	4.5
Discoloration of fish oil	25	4.5
Salmon		
Earnings survey	13	1.3
Smoked fish		
Smoke curing of herring and whitefish	7	3.4
Spoilage		
Marine bacteria	1	0.5
Changes in oyster glycogen content	21	2.02
Actomyosin reactions	21	2.02
Food poisoning caused by putrefaction	21	2.05
Toxin from Staphylococcus	21	2.05
B. proteus in crab-meat poisoning	21	2.05
Tuna		
The Breton sailing tunnymen	3	1.1
Central Pacific tuna fishing	3	1.1
Deep-living tuna	3	1.1
Feeding habits of tuna	3	1.1
Vessels, fishing		
Fresh water by distillation	23	2.14

9.11 STUDIES ON THE FISHING CONDITIONS OF SOME USEFUL FISHES IN THE WESTERN REGION OF WAKASA BAY. I. RELATION BETWEEN THE CATCH OF THE YELLOW-TAIL, SERIOLA QUINQUERADIATA, AND THE METEROLOGICAL FACTORS

Mitani, Fumio
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 2, 89 (1954) (English summary, figure, and tables)

"The relation between the amount of the catch of the yellow-tail (Seriola quinqueradiata) and the meterological factors, such as atmospheric pressure, direction and velocity of wind and air temperature, is statistically analyzed by using the data of the catch."

9.11 A CHAINOMATIC PYCNOMETER FOR THE DETERMINATION OF CHLORINE IN SEA WATER

Rochford, D. J.
Nature 174, No. 4431, 641-642 (October 2, 1954)

(Abstract of this article appears under 0.118 page 15 - December 1954 issue)

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Thomas, H. J.
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Van Horn, Willis M.; Anderson, J. B.; and Katz, Max
Trans. Am. Fisheries Soc. 79, 55-63 (1949)
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Burdick, George E. and Lipschuetz, Morris
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9.4 GROWTH AND DEVELOPMENT OF ONE OF THE NATION'S OLDEST AND LARGEST SEAFOOD ORGANIZATIONS

Anonymous
Southern Fisherman 15, No. 1, 24-25 (January 1955)

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Kask, J. L.
Annual Report of the Fisheries Research Board of Canada for the Year 1953, 185 pp.

(Abstract of this article appears under 0.6 page 13 - March 1955 issue)

9.4 INTERNATIONAL FISHERY COMMISSIONS: THEIR WORK, OBJECTIVES AND RESULTS

Terry, Wm. M. (Office of Foreign Activities, Fish and Wildlife Service)
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